THE BOOK of KNOWLEDGE

THE BLUE BOY, A FAMOUS PORTRAIT OF A HUNDRED YEARS AGO

This fine portrait was painted by Thomas Gainsborough, R. A., to show how blue could be used as the chief colour in a picture.

The Book *of* Knowledge

The Children's Encyclopædia

EDITORS-IN-CHIEF

ARTHUR MEE
Temple Chambers, London

HOLLAND THOMPSON, Ph. D.
The College of the City of New York

WITH AN INTRODUCTION BY

JOHN H. FINLEY, LL. D.
Late President of the College of the City of New York
Commissioner of Education of the State of New York

DEPARTMENTAL EDITORS

All Countries
M. Alston Buckley

Natural History
Ernest Ingersoll

Plant Life
Edward Step

Book of Wonder
Arthur Mee

Familiar Things
Harold Begbie

Men and Women
Ernest A. Bryant

Our Own Life
C. W. Saleeby, M.D.

Famous Books
J. A. Hammerton

School Lessons
A. M. Skinner, B.S.

Poetry and Rhymes
A. Von Hartmann

Dominion of Canada
W. Peterson, D. Litt., LL. D.

The United States
Holland Thompson, Ph. D.

The Earth
Ivin Sickels, M.S., M.D.

Golden Deeds
M. Perry Mills

Stories and Legends
Edward Wright

Things to Make and Do
E. R. Sayre, B.A.

Volume IV

New York: THE GROLIER SOCIETY
London: THE EDUCATIONAL BOOK CO.

Text and Illustrations in this work are protected by copyright as follows:

Copyright, 1911, 1912, 1918, 1919, by THE GROLIER SOCIETY
Copyright, 1911, 1918, by THE EDUCATIONAL BOOK CO.
Copyright, 1910, 1911, 1912, 1918, 1919, by M. PERRY MILLS
Copyright, 1908, by AMALGAMATED PRESS, LTD.
Copyright, 1868, 1870, 1872, 1874, 1875, 1876, 1878, 1881, 1883, 1884, 1886, 1887, 1888, 1889, 1890, 1891, 1902, 1906, by TICKNOR & FIELDS, JAMES R. OSGOOD & CO., and HOUGHTON, MIFFLIN & CO.
Copyright, 1874, 1880, 1892, 1894, 1895, 1896, 1904, 1908, by CHARLES SCRIBNER'S SONS
Copyright, 1908, 1909, by THE CENTURY CO.
Copyright, 1897, by HARPER & BROS.
Copyright, 1906, by THE BAKER & TAYLOR CO.
Copyright, 1901, 1902, 1906, 1907, 1909, by H. C. WHITE CO.
Copyright, 1897, 1907, by THE AMERICAN BOOK CO.
Copyright, 1890, 1899, by JAMES WHITCOMB RILEY
Copyright by PHOTOGRAPHISCHE GESELLSCHAFT
Copyright by KEYSTONE VIEW CO.
Copyright by UNDERWOOD & UNDERWOOD
Copyright by BROWN BROS.
Copyright by BROWN & DAWSON
Copyright by B. L. SINGLEY

The poems by Thomas Bailey Aldrich, Phœbe Cary, Ralph Waldo Emerson, Oliver Wendell Holmes, James Russell Lowell, John Greenleaf Whittier, Henry Wadsworth Longfellow, Edmund Clarence Stedman, Richard Watson Gilder, John Hay, Edward R. Sill, Bayard Taylor and Celia Thaxter included in this work are reprinted by permission of, and by special arrangement with, Houghton Mifflin Company, the authorized publishers of the Works of these authors. The poems by Robert Louis Stevenson, Eugene Field, Mary Mapes Dodge, Richard Henry Stoddard and Henry Van Dyke included in this work are printed by permission of Charles Scribner's Sons.

CONTENTS OF THIS VOLUME

This is a short guide only to the principal contents of this volume. It is not possible to give the titles of all the Poems and Rhymes, Legends, Problems, color pages, questions in the Wonder Book, and many other things that come into the volume, but in all cases are given the pages where these parts of our book begin. The full list of these things comes into the big index to the whole work.

PAGE

THE BOOK OF THE EARTH

What Water Is Made Of . . . 1031
The Great Marvel of Water . . 1189
Three Wonderful Gases . . . 1243

THE BOOK OF THE UNITED STATES

The Revolution 993
Wonderful Mammoth Cave . . 1305

THE BOOK OF FAMILIAR THINGS

How We Got the Piano . . . 1087
The World's Bread and Butter . 1131
How Glass is Made 1263
A Stone a Mile High 1310
Rocks that Look Like Men . . 1311
Rocks that Look Like Animals . 1312

THE BOOK OF WONDER

Why Is the Sea Never Still? . . 1081
What Makes a Current in the Sea? 1082
Why Do We Cook Our Food? . . 1082
Where Does the Wind Begin? . . 1083
Why Is Fire Hot? 1084
Can We Fall Off the Earth? . . 1086
Where Does an Apple Come From? 1159
Is the World Always the Same Weight? 1160
What Makes a Cat Purr? . . . 1161
What Keeps the Stars in Place? . 1162
Why Do We Get Tired? 1162
How Does a Dog Know a Stranger? 1163
Why Is the Snow White? . . . 1164
Why Have We Lines on Our Hands? 1165
Do the Flowers Sleep at Night? . 1283
Why Can We See Through Glass? . 1284
What Is Light? 1285
How Did Men Learn to Talk? . . 1286
Can Animals Talk to Each Other? . 1287
What Makes the Sea Salt? . . . 1288
What is Luck? 1289
Why Cannot We Sleep with Our Eyes Open? 1290

THE BOOK OF NATURE

Some Very Strange Beasts . . . 1011
Animals Living in the Sea . . . 1067
Reptiles, The Oldest Animals . . 1209

THE BOOK OF CANADA

Canada as a Nation 1271

PAGE

THE BOOK OF MEN AND WOMEN

STORIES OF THE SAINTS

The Little Poor Man of Assisi . . 1023
The Giant Who Carried the Poor . 1024
St. Ursula and the Ten Thousand Maidens 1024
The Girl Who Defied an Emperor . 1026
The Boy Who Fled from Rome . . 1028
The Real Santa Claus 1029
The Brave Martyr Girl of Sicily . 1029
The Patron Saint of Shoemakers . 1029
The Sweet Singer of Rome . . . 1030
The Makers of Venice 1167
GREAT BUILDERS OF LONDON . . 1253
The Men Who Built the Tower . . 1254
The Man Who Built St. Paul's . . 1256
The Man Who Built the British Museum 1258
The Man Who Built the Houses of Parliament 1260
The Makers of Trafalgar Square . . 1262

THE BOOK OF OUR OWN LIFE

The Simplest Kind of Life . . . 1019
Where Life Really Is 1121
What Life Is Made Of 1195

THE BOOK OF GOLDEN DEEDS

The Man Who Saved St. Helier . . 1063
The Wolf that Came in the Night . 1064
The Quaker's Stroke 1064
The Tallow Dip and the Black Salt . 1065
Marie Antoinette's Last Sacrifice . 1187
The Brave Cardinal of Milan . . 1207

THE STORY OF FAMOUS BOOKS

BUNYAN'S PILGRIM'S PROGRESS

Christian's Burden Falls from His Shoulders 1125
Christian's Fight with Apollyon . . 1128
The Fate of Faithful, and Christian's Escape 1181
Captives in Doubting Castle . . 1183
The End of the Pilgrims' Journey . 1185

ROBINSON CRUSOE

How Crusoe Ran Away 1223
Crusoe's Escape from the Pirate . . 1225
Crusoe Becomes a Rich Man . . 1226
Wrecked on the Desert Island . . 1227
Crusoe's Life in His Island Home . 1228
The Mysterious Footprint in the Sand 1229

PAGE

THE BOOK OF STORIES

The Story of Child Charity . . 1045
The Greedy Shepherd . . . 1048
The Face No Man Could Look On . 1051
The Yellow Dwarf 1052
The Giant With Three Golden Hairs . 1077
Indian Legends 1105
Puss in Boots 1145
The Fairies and the Hunchbacks . . 1146
The Wizzard's Castle in the Air . . 1148
The Man Who Disappeared . . 1150
The Rose Maiden 1152
The Lily Maid of Astolat . . . 1197
The Three Bears 1201
The Emperor and His Servant . . 1202
The Princess and King Grislybeard . 1203
The Bride of the Wandering Prince . 1204

THE BOOK OF POETRY

THE POETRY OF YOUTH AND MANHOOD 1055
Sir Galahad 1056
Prospice 1056
Dirge for a Soldier 1056
The End of Life 1057
Wishing 1057
Little Things 1057
The Blind Boy 1057
The Shepherd's Cot 1057
The Butterfly's Ball 1058
The Slave's Dream 1058
Minnie and Winnie 1059
Good-night, Good-night! . . . 1059
The Land of Nod 1059
Hohenlinden 1059
THE POETRY OF ACTION . . . 1153
Travel 1154
The Little Star 1156
Queen Mab 1156
Abou Ben Adhem and the Angel . . 1156
The North Wind 1156
Mother's Kisses 1157
A Tragic Story 1157
Joy of Life 1157
The Lion and the Mouse . . . 1157
The Tiger 1157
THE POETRY OF COMMON THINGS . 1291
The Cataract of Lodore . . . 1292
On May Morning 1293
March 1294
The Fisherman 1294
The Parrot 1294
The Useful Plough 1294
Casabianca 1294
Little Verses . . . 1060, 1158, 1295

THE BOOK OF ALL COUNTRIES

The Times of the Stuarts . . . 1035
The End of a Long Struggle . . 1113

PAGE

THINGS TO MAKE AND TO DO

A Handy Writing-Board . . . 1095
Some Favorite Garden Games . 1096
Queer Pictures Built from Squares . 1097
A Trick with a Book 1097
A Little Garden (end of June) . . 1098
How to Make a Cheap Electric Battery 1099
What to Do with a Girl's Workbasket . 1101
Making a Flower-Box for the Window . 1102
The Potato Woman and Her Pig . 1103
Little Problems 1104
Making a Ball of Many Colors . . 1247
How to Make a Magic Knot . . 1248
A Clever Ring and Coin Trick . . 1248
A Little Garden (middle of July) . 1249
Cases for Gloves and Handkerchiefs . 1250
Recipes for Candy 1251
A Little Garden (end of July) . . 1297
Making a Beautiful Belt . . . 1298
How Did the Ladies Cut the Carpet? . 1299
How to Hide in the Open Country . 1299
A Little French Play 1300
Exercises with Dumb-bells . . . 1301
A Simple Copying Apparatus . . 1302
How to Make Invisible Ink . . . 1302
Games to Play at a Party . . . 1303
A Little Box that Makes a Whirlwind . 1304

THE BOOK OF SCHOOL LESSONS

READING

Word-building 1231
Primary Reading Lesson . . . 1233

WRITING

Letters with Loops Above the Lines . 1235

ARITHMETIC

Names of Numbers from 10 to 19 . 1236

MUSIC

The Fairy Meeting on Bass Road . 1237

DRAWING

How to Draw Straight Lines . . 1239

FRENCH

Little Picture Stories 1240

COLORED PLATES

The Blue Boy . . . . *Frontispiece*
The Witch and the Miller's Son . . 1080
The Fire Inside the Earth . . . 1086
Lizards and Crocodiles . . . 1217

THE HISTORY OF THE UNITED STATES

WE learned in our last story of the United States, how the English and the colonists together drove the French out of North America. Only a few years later these same colonists rose against the English and said that England should no longer rule them. The war known as the Revolution followed, and after seven years the colonists, helped by the French, compelled England to agree that the thirteen colonies were to be independent states in the future. We shall learn in these pages of the reasons for the Revolution, and shall be told how the few colonists were able to contend so long against the mother country, in spite of great difficulties and hardships. Finally, as we shall see, England grew tired of the vain struggle, and the way was open for the birth of a new nation, which has grown into the present United States of America.

THE REVOLUTION

CONTINUED FROM 966

THE English and the colonists fought side by side against France and succeeded in forcing that nation, in 1763, to give up all its lands in North America either to England or to Spain. Only a few years afterwards the colonists were fighting against the English, and the French were helping the colonists. How did these changes come about?

The whole story of these changes is very long and hard to understand because one must know so many other things first, but the principal reason the colonists fought England was on account of taxes, though that is not the only reason. The French helped the colonists because they thought they could in this way punish the English for the loss of their possessions in North America, and yet this is not the only reason either. Nearly always when a nation or a person follows some particular policy or plan, it is for more than one reason. You have heard many times some one say that he did something because of this, and of that and of the other reason.

THE EUROPEAN IDEA OF THE USE OF COLONIES

The trouble which finally led to the Revolution began, in fact, when the different colonies were first planted. All the countries of Europe thought that the only reason a colony had for existing at all was to help the mother country. No matter how much any rule or law hurt the colony, the old country thought it a good one if it helped it even a little bit. Though the colonists were of the same blood as their relatives who remained in the old country, somehow they were supposed to be inferior to those who had stayed at home, and to have no real rights. We find in the history of colonies in America and elsewhere, many stories which show how the old countries looked down on the new. You remember how General Braddock said that the Indians might defeat the "raw militia" but that they could make "no impression on the King's Regulars."

HOW A COLONY MIGHT HELP THE MOTHER COUNTRY

Now there were three ways by which a colony might be of use to the mother country. First, by supplying the precious metals, such as gold and silver; the second, by buying the goods of the old country; and the third, by furnishing those goods which could not be grown or made in the old country.

Only the Spanish colonies in Amer-

Copyright, 1910, 1918 by M. Perry Mills.

ica furnished gold and silver, and they were really more like armed garrisons than colonies. The English and the French colonists found little or no gold or silver, though they wasted much precious time looking for them. The French colonies in Canada supplied many valuable furs and the English colonies also hunted animals for their fur. The English colonies, however, could grow several articles such as tobacco, rice, indigo, pine trees for masts for ships, which England wanted very much. Then too, they could furnish large quantities of tar and pitch, which were also valuable in building and repairing ships.

TRADE ONCE THOUGHT A GAMBLE IN WHICH ONE SIDE MUST LOSE

Now we must also think about some strange ideas that people of that time had about trade. They thought that trade was like gambling in which one side must lose. Now we know that there is such a thing as fair trade, in which both parties may gain. To make this clear let us go back to the days when there was no such thing as money and see how people could get the things which they did not or could not easily get by their own labor.

Suppose that one man was a good fisherman, and another had learned how to make very quickly the sandals or moccasins which people wore on their feet. Now if the fisherman wanted to make a pair of sandals, he had to find a piece of skin suitable for the purpose, then had to prepare it and then cut out and sew together the pieces. All of these processes would take a great deal of time. If the sandal-maker attempted to catch fish for himself he was forced to get ready hooks and lines or nets, make or rent a boat or else sit on the bank and try to get fish. In the time that it would take him to catch fish enough for his family he might be able to make several pairs of sandals.

Would not both men be better off if the fisherman should give some of the fish caught for a pair of sandals? Each would be doing the thing which he could do best, and each would profit by doing that and by not trying to do something which he could not do well. This idea is called the "Division of Labor" and is just as true after money appears and the fisherman sells the fish he does not need for his family and buys a pair of sandals with money.

THE EUROPEAN COUNTRIES MAKE LAWS TO CRIPPLE THE COLONIES

A hundred and fifty years ago very few men understood the truth that both parties in a trade could gain, and none who did understand it had any part in making laws. So the nations which had colonies made laws which were intended to prevent the mother country from losing in trade with her colonies. The result was often that both parties lost.

England began to make such laws soon after the first colonies were planted in America and continued to make others. No American colony could send rice, indigo, tobacco and certain other articles to any country except England, and they must be carried in an English or a colonial ship. The colonists were not allowed to buy their goods from any nation except England. So you see that if France wanted some article produced in the colonies, and the colonists wanted some French article in exchange the French must first sell what they had to English merchants and then buy from them the colonial goods they wished. In this way you can see that the English merchant made two profits and the English or colonial ship-owner was paid for carrying the goods to and from America.

But this was not all. As the colonies advanced some began to manufacture some articles from iron, and to make hats, cloth and a few other things. thus shutting off a part of the British market. So laws were passed forbidding the colonists to manufacture certain goods. They must send their wool to England to be made into cloth, and their iron to be made into pots or ploughs. When the colonists began to raise more grain than they needed they were not allowed to send any to England unless a tax on every bushel was paid, for the English farmer thought that he would be injured if American wheat was imported.

THE COLONISTS PAY NO ATTENTION TO THE LAWS

At first these laws made very little difference to the colonists because they were not enforced. The colonists traded wherever they pleased, and

though they were forbidden to send ships to other British colonies, they did so whenever they pleased. There were three reasons for England's neglect. She was busy much of the time with wars in Europe; at first the colonial trade amounted to very little; and then she was afraid that if the colonists were annoyed very much they would make friends with the French who claimed such a large part of North America. One of the English ministers said that the colonists paid in taxes on goods brought in only $10,000, and that it cost $40,000 to collect this sum.

But about 1760, the English government showed a new spirit. George III came to the English throne and he was determined to be king in fact as well as in name. His grandfather and great-grandfather had both been born in Germany, and never really felt at home in England. Because they could not speak English well they had had very little to do with the government, and gradually a few powerful families had come to be the real rulers of the country. George III was determined to change all this. He intended to bring all the parts of the British Empire under the same regulations.

French and Indian War really the beginning of the Revolution

Another reason was that the French and Indian War, then being fought, was going against the French and it was believed that the French would soon be driven out. But all through the war the British felt that the colonists did much less than they should have done. Each colony was jealous of every other. There was no central government and each colony did as much or as little as it pleased toward the common defence.

On the other hand the colonists had fought by the side of regular troops and had done as well or better in many battles. They began to have more confidence in themselves and to think of themselves as a part of the British Empire, not as under the British Empire. They acknowledged George III as their king but began to say that Parliament had no right to make laws for them, but that the legislature of each colony was the little Parliament of that colony.

The British government after the French and Indian War decided to keep an army in the colonies and to appoint and pay the judges, as it was felt that the judges appointed or elected by the colonists themselves decided too often against the British merchants or officers. It was also decided to make the colonists pay a part of the cost. This seemed fair to the English as the French and the Indians had been much dreaded by the colonists.

The Stamp Act arouses the colonists to resistance

Several new laws about taxes were made, but that known as the Stamp Act was most disliked. It was passed by the British Parliament in 1765. According to this act all law papers such as wills, deeds, appointments to office, licenses to sell liquors of any kind, charters, mortgages, and the like must be written on stamped paper, each sheet of which cost from six cents to fifty dollars. Every newspaper or pamphlet and every almanac must also be printed on stamped paper of a cheaper kind. Every advertisement and every package of cards also had to pay a stamp tax. It was thought that the tax would amount to about a half million dollars a year. Such taxes were paid in England and very few people there seem to have had any idea that the colonists would object very much.

This law did not seem very hard to England. She had not been harsh toward her colonies. All the European nations treated their colonies much more severely than she had done. But England had left the colonies alone too long. They had grown to believe, as we said above, that Parliament had no right to lay any tax on them as they had no voice in Parliament. There was great excitement in every colony and the people determined to resist. In several colonies secret societies called "Sons of Liberty" were formed to resist the officers.

Another thing which made the colonists angry was an order that the western lands, which had been won from the French, should not be settled at that time. The colonies thought that these lands belonged to them, and were not willing to give them up. Then, too, they felt that prices of everything they bought would be higher because of the new taxes they were to pay.

THE COLONISTS DECIDE TO BUY NO GOODS FROM GREAT BRITAIN

Many people agreed to buy no British goods. In some towns men in charge of the stamps were beaten and ordered to resign. If they refused, their houses were burned and they were threatened with hanging. Many boxes of stamps were burned by the mobs, and some of the leading men elected from most of the colonies drew up a paper saying that there ought to be "no taxation without representation." In only two colonies were any stamps used, and not many were used in these.

The English people were astonished at the anger of the Americans. They themselves paid stamp taxes, heavier than were charged the colonists. But they had forgotten that the colonists were Englishmen, and the English people had settled once for all when they cut off the head of Charles I that they would not be taxed without the consent of their representatives. Some Englishmen said that every member of Parliament represented everybody in the whole British possessions, but the colonists said that a man could not represent a country in which he did not live.

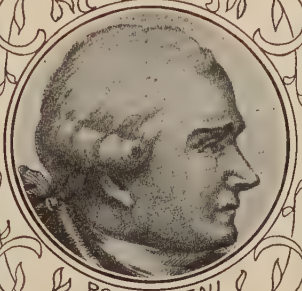
This quaint picture of the Boston Massacre was made from a very rare old print engraved by Paul Revere, who carried the news of the British march on Lexington and Concord to the farmers along the road. We must confess that Revere, who was a goldsmith in Boston was more successful as a messenger than as an artist. He became a prominent citizen of Boston, grew rich and had great influence in politics. Some of the houses shown in the picture are still standing in Boston to-day.

THE STAMP ACT REPEALED BUT OTHER TAXES PUT IN ITS PLACE

Parliament repealed the Stamp Act in 1766 but still declared that it had the right to pass any laws it pleased for America. The next year an act was passed placing taxes on all tea, glass, lead, paints and a few other

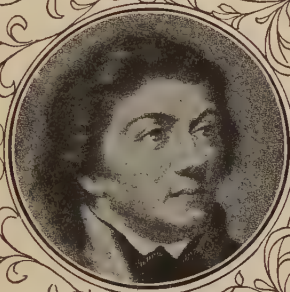
FOREIGN FRIENDS AND FOES

LAFAYETTE

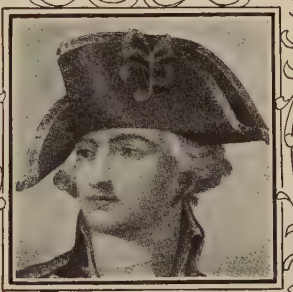


ROCHAMBEAU

STEUBEN

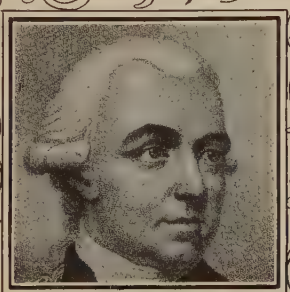


KOSCIUSZKO

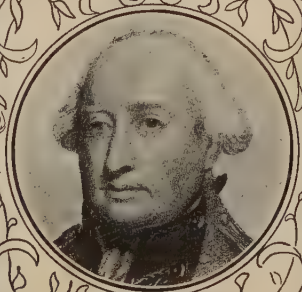


BURGOYNE

HOWE



CLINTON



CORNWALLIS

TARLETON

Lafayette and Rochambeau were brave Frenchmen who fought for us. Baron Steuben, a brave German officer, and Kosciuszko, a gallant Pole, also helped the American cause. General Burgoyne surrendered at Saratoga in 1777, while General Howe, and Sir Henry Clinton found conquering America was hard work, and Lord Cornwallis surrendered his entire army. Tarleton was a cruel British cavalry leader.

articles brought into the colonies. The money was to be used to pay the salaries of governors, judges, and other officers. The colonists had had some power over their officers before this time, for, if they had felt that the governors were wrong, they had refused to pay their salaries. This act would make all officers servants of the king instead of the people.

The colonists determined to resist. First they agreed to buy none of the taxed articles, and the legislatures began to talk about resisting by force. The governors of some colonies ordered the members of the legislatures to go home. In Boston there were several riots and in 1768 the King sent some soldiers there. The soldiers and the people were constantly quarreling. In March, 1770, a few soldiers fired upon a mob which was throwing stones and snowballs at them, and killed four and wounded seven. This was called the "Boston Massacre." We show you a picture of it, from a rare old engraving made at the time by Paul Revere, whom we shall hear about in another place.

WHAT DOCTOR JOHNSON THOUGHT ABOUT AMERICAN RIGHTS

The merchants of London were all this time losing much money because the colonists refused to buy their goods, and many other men wished Parliament to stop trying to tax America. George III, however, was almost insane on the subject, and said that any man who thought such a thing was an enemy of his country, and he made Lord North, who was the chief minister, do as he said. Doctor Samuel Johnson, the author, about whom you can read in another part of our book, said that the Americans "ought to be thankful for anything we allow them short of hanging."

Parliament, only a few weeks after the "Boston Massacre," took off the tax on all articles except tea, but a tax of six cents a pound was left on that popular drink. The colonies were not satisfied. They objected to paying the tax. In North Carolina some of the inhabitants who said that they were unjustly taxed, called themselves Regulators, and drove out some judges. They were defeated on Alamance Creek in 1771 by troops under the royal governor, William Tryon, and about two hundred were killed or wounded. Many others crossed the mountains into the territory which afterwards became Tennessee and Kentucky.

THE BOSTON TEA PARTY SHOWS WHAT MIGHT FOLLOW

Still the colonists refused to buy tea from England and brought in tea from Holland which paid no duty at all. So the English tried a trick. Always before this time the tea sent to America had passed through some British port and had paid there a tax of a shilling. Now the tea intended for sale in America was no longer to pay this tax in England, and in America only the six cent tax was to be paid. In this way the American would get his tea much cheaper than the Englishman could get his. It was thought that the Americans would buy this tea, since they could get it cheaper than any other, and therefore pay the tax. Ships loaded with tea were sent in 1773 to Charleston, Philadelphia, New York and Boston. At Philadelphia and New York, the tea-ships were sent back. In Charleston the tea was stored in damp cellars where it soon spoiled. In Boston a party of men disguised as Indians boarded the ships one night and emptied the tea into the bay. This was the "Boston Tea Party."

The English government now determined to punish these deeds. Even those members of Parliament who had been friendly to the colonists thought that they had gone too far. Several very strict laws were passed, and the port of Boston was closed to ships. An army officer, General Thomas Gage, was put in charge, with the hope that Massachusetts would be starved and the other colonies would be so frightened that they would submit at once.

The result was not what the British expected. The other colonies sent food to Boston by land and Massachusetts refused to pay any taxes to General Gage's government. The Colonies, except Georgia, elected delegates who met in Philadelphia in September, 1774, and called themselves a Continental Congress. This body sent a letter to England telling of their wrongs. Then it published a "Declaration of Rights" in which all the rights of British citizens were claimed, and finally agreed to recommend that the people should buy

no British goods until the colonies were treated better.

THE COLONIES PROPOSE TO RESIST BY FORCE

The different colonies at once began to organize troops and to collect weapons, powder and bullets. General Gage heard that a large quantity was stored in the little village of Concord, near Boston, and on the night of April 18, 1775, troops left Boston to capture or destroy these stores and to arrest two leading patriots, John Hancock and Samuel Adams, who were then at Lexington. But some of the Boston people were watching the soldiers very closely and Paul Revere, a Boston goldsmith, and others galloped ahead and warned the people. Perhaps you have read Longfellow's poem, which tells of Paul Revere's ride, which stirs the blood, though it is not quite accurate.

When the troops reached Lexington they found a little band of farmers drawn up on the village green. The British commander, Major Pitcairn, ordered them to disperse. They did not move until they were fired upon. Seven were killed and nine wounded. As they were too few to offer battle they scattered in every direction. The Revolutionary War had begun.

After the Americans were dispersed, the British marched on seven miles to Concord, only to find that most of the stores had been removed and that other bands of stubborn farmers were on the ground. Here sharp fighting followed and the British troops were forced to begin a retreat. At Concord Bridge the contest was hardest. Ralph Waldo Emerson has written a poem about the fight which you may find on another page. The British did not retreat a moment too soon. The news of the encounter at Lexington had spread like wildfire throughout the country, and the farmers with their trusty rifles came swarming from every direction like angry bees around the troops.

You read of the Battle of Lexington and Concord on April 19, 1775, in the text. Here you see how the Massachusetts farmers, young and old, rushed to arms, and almost without leaders fired at the British from behind trees and walls until the soldiers were forced to run for their lives. Only the arrival of reinforcements saved all of them from capture. This battle had great influence in making people decide to resist.

THE RETREAT OF THE BRITISH FROM CONCORD AND LEXINGTON

From behind walls, trees and fences, the bands of minutemen fired upon the retreating troops, and then hurried by short-cuts across the fields to fire again.

The retreat became a rout and the whole force would have been destroyed or captured if reinforcements from Boston had not come out to meet the weary soldiers who had marched all day and who had had nothing to eat for fourteen hours. During the day the British lost nearly 300 men while the American loss was less than 100 all told.

The news that war had begun spread rapidly, when we consider that none of our modern methods of scattering information were in existence. There were no telegraphs or telephones, no railroads or steamboats; but riders with swift horses told the story. From all New England, men hurried to Boston. Benedict Arnold and Israel Putnam led volunteers from Connecticut and John Stark came down from New Hampshire. Putnam is said to have left his oxen hitched to the plough. Soon 16,000 men were besieging Boston. On the 10th of May the forts at Ticonderoga and Crown Point were taken by the Green Mountain Boys under Ethan Allen and Seth Warner, and a large supply of powder and many cannon were taken. Some of these guns were later taken to Boston to be used against the British there.

THE MECKLENBURG DECLARATION OF INDEPENDENCE

When the news reached North Carolina late in May, the inhabitants of Mecklenburg County assembled at Charlotte and took the bold step of declaring themselves independent of Great Britain. The royal governor, before he fled to the protection of a British war vessel at Wilmington, called the resolutions the "most horrid and treasonable publications yet issued in America."

The troops around Boston determined to fortify the high ground overlooking the city, and on the night of June 16th began to throw up earthworks on Breed's Hill. The next day the British attacked, and were twice driven back, with the loss of 1,000 men, but the third assault was successful as the Americans had used all their powder. This was the battle of Bunker Hill, as that was the hill the troops had been expected to fortify.

GEORGE WASHINGTON MADE COMMANDER-IN-CHIEF OF THE ARMY

Meanwhile the delegates from the different colonies, calling themselves the Second Continental Congress, had met at Philadelphia and voted to raise an army. The Virginian of whom we have heard before was chosen to lead. On the 3rd of July, 1775, George Washington, standing under a great elm at Cambridge, took command of the raw troops and at once began to drill and organize an army.

In spite of these battles the American people as a whole were not yet ready to separate from England. They claimed that they were not fighting against England but against the bad advisers of the King, and Congress sent another petition to him, which he refused to read. Almost immediately he hired about 20,000 troops from the rulers of some small German states. One of these states was Hesse-Cassel and therefore these troops were generally called Hessians. They were much hated by the Americans but the men themselves were not to blame. In their own country they were little better than slaves, and could not disobey their ruler, who received so much a head for them.

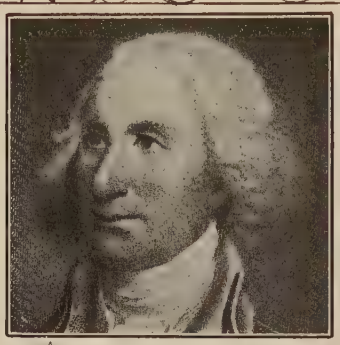
With Washington at Cambridge were many men who became famous in the war which was to follow, among them Benedict Arnold, Daniel Morgan, John Stark, Nathanael Greene, Israel Putnam and Philip Schuyler. Two others, Horatio Gates and Charles Lee, for a time were much valued but proved failures in the end. All these set to work to make an army, for a mob which has not been drilled or disciplined is not an army though it may accomplish great things while the enthusiasm lasts.

THE UNSUCCESSFUL ATTACK ON CANADA FOLLOWS

Congress decided to try to capture Canada. General Montgomery took Montreal on November 12, 1775, and the next day Benedict Arnold appeared before Quebec. Later he was joined by Montgomery and on the last night of the year they attacked the town, but Montgomery was killed, Arnold severely wounded, and a part of the army was captured. The Britons soon sent more troops and the Americans were forced to retreat. But while the American soldiers were meeting with failure here, Washington was able to force the British to give up Boston, where they were obliged to leave many valuable military stores. Washington then moved to New

AMERICAN REVOLUTIONARY GENERALS

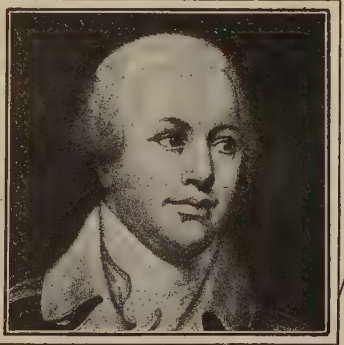
PUTNAM



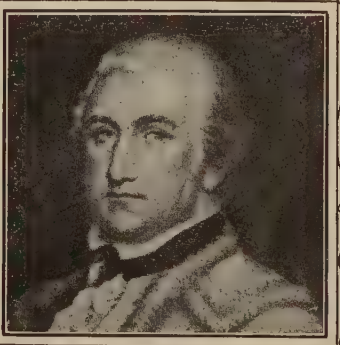
SCHUYLER

MARION

WAYNE



GREENE



MORGAN

Here are six of the leading Revolutionary generals. Israel Putnam was a brave Connecticut farmer, who fought all through the war. Philip Schuyler was about to capture Burgoyne when Gates was unjustly put in his place. Wayne was sometimes called "Mad Anthony," because of his bravery in battle, while Francis Marion was called the "Swamp Fox," as the British could not catch him. Daniel Morgan was a good officer, and, next to Washington, Nathanael Greene was the best American general.

York, which he knew would be soon attacked.

What the words Whig and Tory meant during the Revolution

The feeling that the colonies must be independent was growing fast, but in almost every colony there was a strong party which wished to remain under English rule. These people were called Tories, while the independence party took the name Whig. In North Carolina, 1,600 Scotchmen, recently arrived in the colony, marched toward Wilmington to join Sir Henry Clinton. They were met at Moore's Creek, February 27, 1776, by about 1,000 Whigs and put to rout. Among the prisoners was Allan Macdonald, the husband of the famous Flora Macdonald, who had helped the Young Pretender to escape. Sir Henry Clinton was so much discouraged by the battle that he did not try to take Wilmington but sailed on to Charleston. There a rude fort had been built of palmetto logs, and the guns of the fleet did little harm, while the ships were badly shattered.

A paper which has changed the history of the world

Soon after Moore's Creek, North Carolina voted for complete independence, and other states soon followed. The royal governors had been driven out and elected ones put in their places. On the 7th of June, 1776, Richard Henry Lee, of Virginia, moved in Congress, "That these United Colonies are, and of a right ought to be, free and independent states." The question was discussed for several weeks, for many good men had not yet given up hope that England and the colonies might somehow agree. Finally, on July 2nd, twelve colonies voted for independence and began to discuss the words in which they were to publish what they were going to do. On July 4, 1776,— a date all Americans must remember,— the Declaration of Independence, written by Thomas Jefferson, was agreed upon. We shall not stop here to say much about this paper which declared that the colonists would no longer be subject to England for we hope to tell more about it in another place.

You are sometimes told that the Declaration of Independence was signed upon July 4, 1776. This is not quite true. It was agreed upon on that date but it was not signed until much later, after a copy had been made upon parchment. Some men who had voted for it were not present when the copy was finished and did not sign until months afterward. One man, who helped to draw up the paper, never signed it.

Everywhere the news was received with joy. Bells were rung, bonfires were lighted and people marched in torchlight processions. In New York a leaden statue of George III stood in the little park called Bowling Green. This the people pulled down and sent to Connecticut to be made into bullets. In other places everything which reminded the people of English rule was torn down.

The British plan to divide the colonies

The war was now begun in earnest. We cannot describe all the battles, but shall tell of the most important. The first plan of the British was to gain control of the Hudson River. In this way New England would be cut off from the other colonies and it was thought that success would be easier. One army was to move down from Canada while another under Lord Howe was to capture New York City, then held by Washington. The Canadian army was driven back by Benedict Arnold, but the other was more successful.

General William Howe and his brother, Lord Howe, who commanded the British fleet, had many more men than Washington and hoped to capture the soldiers stationed on Long Island. The American troops were badly defeated in the battle but the night of August 29, 1776, was dark and foggy. Washington crossed over the East River and escaped without losing a man. He then marched to the northern part of Manhattan Island and camped about where the College of the City of New York stands. Howe followed but was defeated in a battle on Harlem Heights near where Columbia University now stands. In order to escape being surrounded, Washington was forced to retreat from Manhattan Island. At White Plains, Howe gained some advantage on October 29th and on November 16th captured Fort Washington on the Hudson River and took 3,000 prisoners.

THE DECLARATION OF INDEPENDENCE BEFORE CONGRESS

John Trumbull, a Revolutionary soldier, who had been Washington's secretary, after the war went to London to study painting. On his return he painted the portraits of many men prominent in the struggle. The original of this picture is in the Capitol at Washington. The man in the chair is John Hancock, President of Congress. The five men standing before him are the Committee to draw up the Declaration, Benjamin Franklin, Thomas Jefferson, Robert Livingston, Roger Sherman and John Adams.

WASHINGTON IS FORCED TO RETREAT ACROSS NEW JERSEY

Washington feared that Howe intended to march on to Philadelphia, and crossed over into New Jersey. Nearly half of his army was still on the New York side, under General Charles Lee, who was ordered to cross into New Jersey also, but that officer, who was jealous of Washington, and thought that he himself ought to be commander-in-chief, did not obey promptly and Washington was forced to retreat across New Jersey into Pennsylvania. When Lee did cross, he was captured through his own carelessness but his little army joined Washington. On Christmas night, Washington, with 2,500 men, recrossed the Delaware River, then filled with floating ice, and captured 1,000 prisoners at Trenton.

The British had begun to think that the war was over and it is said that some of the officers had sent their baggage on board ship at New York, expecting to return to England. But when the news of this sudden stroke came, the British officers hurried back to New Jersey, only to have a part of their forces surprised and defeated at Princeton, a little more than a week after the defeat of Trenton. Washington was not able to risk a battle with the whole British army and soon withdrew into the hills around Morristown, where the British were afraid to attack him.

AMERICAN SUCCESS LEADS TO HELP FROM FRANCE

The result of the first year or the war was on the whole favorable to the Americans. Though New York had been lost, and Fort Washington captured, and though the American army had been defeated at Long Island and at White Plains, it had been proved that the American soldiers were a match for an equal number of British. Washington had shown military ability which surprised Europe, and the British began to be afraid of him and some wished to give up the war. France became interested and began to loan money. Some French officers came over to fight in the American army. Among these was the Marquis de Lafayette, whom Washington afterward came to love like a son. He was only a boy when he arrived, but soon became a good soldier.

THE BRITISH AGAIN PLAN TO CUT THE COLONIES IN TWO

The British still intended to cut the colonies in two by capturing the Hudson River. So the plan for 1777 was for an army under General John Burgoyne to march down from Canada along Lake Champlain toward Albany. Another was to start from Lake Ontario, move down through the Mohawk Valley, stir up the Tories and the Six Nations and finally join Burgoyne. The third army, under Howe, was to march up the Hudson from New York to Albany. General Philip Schuyler, the American commander, had a very small force at first, and was not able to fight Burgoyne, but as he retreated, he cut down trees, broke down bridges, and made the roads so bad that Burgoyne spent twenty days in moving twenty miles. Some Indians joined the British, but few Tories came, and the Indians did more harm than good, for their cruelty stirred up the Americans to join Schuyler. Burgoyne sent a party of Hessians to capture some military supplies the Americans had collected at Bennington, Vermont, but General John Stark defeated the British force and took 600 prisoners. The other British army, which had been expected to come from Lake Ontario to arouse the Tories and Indians and then join Burgoyne, was defeated at the battle of Oriskany, near Fort Stanwix. The Indians left the British and all retreated.

Just when Schuyler's army had grown large enough to attack Burgoyne, his enemies in Congress succeeded in having General Horatio Gates put in his place. On the 19th of September and on the 7th of October, 1777, two bloody battles were fought near Saratoga and were won by the Americans, largely through the efforts of Schuyler, Arnold and Morgan, though, of course, Gates got the credit. Burgoyne surrendered his whole army on the 17th of October, as Howe had sent no help.

THE BATTLES OF BRANDYWINE AND GERMANTOWN

Howe had made the mistake of trying to take Philadelphia before going to the aid of Burgoyne. Washington opposed him at Brandywine Creek, September 11th, and though defeated, delayed the British for some time, and three weeks later only a fog prevented

HARDSHIPS OF THE REVOLUTION

On Christmas night, 1776, Washington crossed the Delaware River with 2,500 men, and surprised a force of Hessian troops at Trenton, New Jersey, capturing 1,000 of them. The weather was so cold that the Hessians thought no army could move. Our picture was made from the painting by Leutze, now in the Metropolitan Museum, New York City. It is a spirited picture even if the boat is overloaded.

Valley Forge is a village near Philadelphia. Here Washington's army spent the winter of 1777-78, suffering much from cold, hunger, and lack of proper clothing. Here we see Washington and Lafayette, tramping through the snow, inspecting the defences, and cheering up the half-starved and poorly clothed soldiers who were on guard duty. Because of bad management food and clothing were not delivered.

an American victory at Germantown. Soon it was too late for Howe to aid Burgoyne. Though unsuccessful in two battles and though Philadelphia had been taken by Howe, Washington had gained more than he had lost, for he had enabled the northern army to capture Burgoyne.

UNNECESSARY SUFFERING AT VALLEY FORGE

During the winter of 1777-78 the British enjoyed themselves in Philadelphia, but for Washington's army in the little village of Valley Forge it was a time of horror. There was not enough food, and clothing was scarce. Sometimes the men left bloody tracks upon the snow and it was difficult to keep them from going home. And the worst thing about this suffering was that it was unnecessary, if the American Congress had known how to manage better. There was food enough and clothing enough in the country if it had only been sent to the right places at the right times. During this dreadful winter some members of Congress and some army officers tried to put Gates in Washington's place but failed as they deserved.

FRANCE AGREES TO HELP THE AMERICANS IN THE WAR

But in all this discouraging time, one bright thing happened. France had been loaning money to help carry on the war. Now she recognized the independence of the colonies, made a treaty with them, and agreed to send a fleet to help. The surrender of Burgoyne had been so discouraging to England that in February, 1778, the British government gave up every single point in the dispute and agreed not to try to levy any taxes on the colonies if they would disband their armies. If this had been done three years before there would have been no war, but it was now too late. The people would be satisfied with nothing less than complete independence.

During all this time the colonies had had no regular navy, but had sent out privateers to attack the British merchant ships and had captured many of them. A privateer was a ship owned by a citizen which was given permission to attack and capture ships belonging to the enemy. These privateers were so successful that the British had begun to send a war-ship with every merchant fleet to protect it. Later, by the help of France, a few war vessels were gotten together and under John Paul Jones did considerable damage to the British, who called him a pirate. They even demanded that other nations should give him up if he sailed into any of their harbors, and the fact that Holland would not, had much to do with bringing about a war with that country.

WAR NOW IS CARRIED ON IN THE SOUTH

England was soon at war with France, Spain and Holland and so could not send over enough troops to crush the Americans. In 1778-79 no very important battles were fought but the British tried harder to persuade Tories to enlist in the army. The plan of the war was also changed. Instead of trying to cut the colonies in two, troops were sent to the South to conquer those colonies one at a time, but the Tories and Indians were stirred up in all the colonies. Georgia was soon taken, as the colony was very weak, and soon South Carolina was also under British authority.

For a time there was no army in the state but not all were willing to give up. Small bands of patriots, under Francis Marion, Thomas Sumter, Andrew Pickens, and others, hid in the swamps, from which they dashed out to attack the Tories or even small bands of British troops, and would retreat to their hiding-places before they could be captured. They could not do much but they kept the British uneasy. Marion was often called the "Swamp Fox" and Sumter the "Game Cock," one because he was so silent and so swift in his movements and the other because in battle he fought to the death.

THE STORY OF MARION AND THE BRITISH OFFICER

Perhaps you have heard the story of the British officer who visited Marion under a flag of truce. A flag of truce is an arrangement by which one is given permission to approach an enemy on business without being fired upon, or being taken prisoner. The officer was met at a certain place by some of Marion's men, who blindfolded him and led him through the swamps. Finally the bandage was removed from his eyes, and he found himself in a little open space in the forest. His business was

HARD FIGHTING IN THE SOUTH

Major Patrick Ferguson was one of Cornwallis' best cavalry officers, and was sent to enlist the Tories in the British army, and to subdue the western part of North and South Carolina. At King's Mountain, near the line between the two states, he was surrounded, October 3, 1780, by the backwoodsmen from Virginia and the Carolinas. Some came over the mountains from what is now Tennessee. Ferguson and 400 of his men were killed and the remainder were taken prisoners. This blow forced Cornwallis to retreat.

The next year Colonel Banastre Tarleton, the chief British cavalry officer, attacked General Morgan at the Cowpens and was badly defeated. During the battle, Colonel William Washington, who was not a relative of General Washington, met Tarleton in personal combat and wounded him in the hand. This was one of the most brilliant victories of the war and did much to cheer the drooping American spirits.

soon finished and Marion asked him to remain to dinner. The officer saw no cook and no evidence of cooking though a fire was burning on the ground, but accepted. Then Marion told his servant to serve dinner. The servant raked aside the ashes of the fire and drew forth some sweet potatoes which had been roasting there. These he served on pieces of bark. There was no other food. Whether this particular story is true or not, the American soldiers often had little more to eat than this.

GATES IS DEFEATED AND FLIES FROM THE FIELD

When an army was raised to try to recapture South Carolina and Georgia, it was put under the command of Gates whom many still thought to be a great general, because the troops under his command had captured Burgoyne. While marching to make a night attack on Cornwallis in August, 1780, he was met at Camden by that officer, who was also marching to surprise him. The American army was cut to pieces and it is said that Gates rode his horse seventy-five miles without stopping in his wild flight. Many people grew discouraged and the British felt that the whole South would soon be in their power.

ARNOLD'S TREASON SHOCKS THE COUNTRY

Just about this time the treason of Benedict Arnold, about which you may read on another page, shocked the country, but a victory occurred soon after and aroused more hope. Colonel Patrick Ferguson, one of Cornwallis's officers, with about 1,100 British and Tories was defeated and killed at King's Mountain by a band of backwoodsmen from Virginia and the Carolinas, who fought without a leader, and killed or captured all of the British force. A new army was raised and put under Nathanael Greene. Meanwhile Morgan defeated Tarleton, the British cavalry leader, at the Cowpens, in South Carolina, and then retreated into North Carolina to escape Cornwallis. Morgan was joined by Greene, and Cornwallis followed but could not overtake them. Finally Greene turned and a battle was fought at Guilford Court House, near the present city of Greensboro, North Carolina. Though the Americans were defeated, Cornwallis lost many men and decided to march to the seacoast. After reaching Wilmington, he then determined to go to Virginia to join other British commanders there. Greene marched back to South Carolina and soon drove the British into Charleston.

In Virginia, Cornwallis tried to capture Lafayette who had a small force, saying, "The boy cannot escape me," but the boy did, and his force grew larger, as the Virginians joined him. At one time Cornwallis almost captured Thomas Jefferson, then the governor of the state. Cornwallis determined to retreat toward the sea, and sent to Sir Henry Clinton in New York asking reinforcements. Early in August he reached Yorktown, on the York River, and waited for an answer. Clinton, however, believed that New York was much more important than Virginia and would not send any more men.

WASHINGTON TRANSFERS HIS ARMY TO THE SOUTH

Washington was then on the Hudson River near West Point. The year before, 6,000 French troops under Count Rochambeau had been sent over, and just now Washington learned that a strong French fleet under Count de Grasse was on the way. He determined upon the bold idea of leaving New York and marching to Yorktown. On August 19, 1781, the march was begun, and Philadelphia was reached before Sir Henry Clinton knew what he was doing. The French fleet prevented General Clinton from sending any aid by water, and soon the American and the French armies, about 16,000 in all, were at Yorktown. The siege was begun, no help came to the British general, and on October 19, 1781, Cornwallis surrendered 7,247 men and 840 sailors, more than 8,000 men in all.

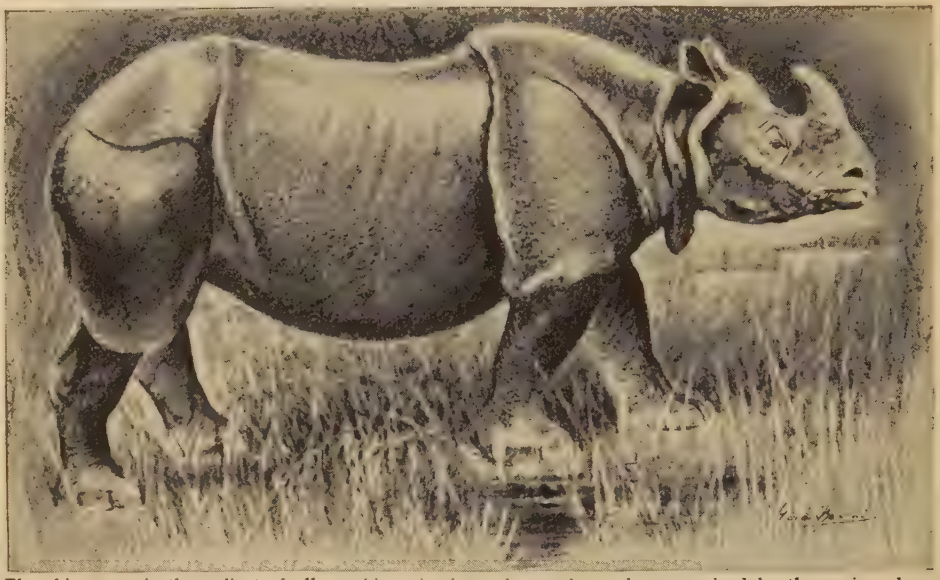
The American army was drawn up in one line, the French in another. Between them marched the captured army with bands playing a tune called "The World Turned Upside Down." How proud Washington must have felt as he looked over his veterans and remembered the dangers, hardships and discouragements through which he had passed. Cornwallis, sick with mortified pride and bitter regret, remained in his tent, and sent his sword by another.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1305.

THE MAN WHO LOST & THE MAN WHO WON

This is a picture of one of the closing scenes in the War of Independence, which, after lasting over six years, was ended by the fall of Yorktown, where General Cornwallis and a British army were besieged. This picture shows Cornwallis with his generals during the siege, shortly before he surrendered, in October, 1781, to General Washington and the French General Rochambeau. The surrender of Yorktown ended the war.

George Washington had no easy task in commanding the American army. The British army was made up of trained soldiers; but the American troops were farmers, or huntsmen, or townsmen, who left their business to fight, freemen whom it was difficult to force into discipline, because each man thought himself as good as an officer. Also, it was a difficult thing to provide these men with arms and equipments and pay, and often many of them wanted to go and take care of their business. Still, Washington managed to keep them together, and he led them to victory. This picture shows his farewell to his generals at the close of the war.



The rhinoceros is the ugliest of all our big animals, and can always be recognized by the curious horn on its nose. Some rhinoceroses have two horns and some only one. These animals live wild in Africa and Asia, and they are extremely savage and bad-tempered. The rhinoceros does not wait to be attacked, but will rush on a man as soon as it sees him. The horn is not bone, but hair grown solidly together.

The hippopotamus is one of the largest land animals, often as large as an elephant, with much shorter legs. It lives in Africa, and spends most of its time in the water. It is able to remain below the surface for as much as ten minutes at a time. It has the power of closing its nostrils so that it can keep in its breath and also prevent the water from entering. Its great mouth opens like a cavern and it has enormous teeth of hard ivory. It has very short legs in proportion to the rest of its body.

WHAT THIS STORY TELLS US

WITH a generous hand Nature strews the whole earth with food. That which is useless to one creature may be the one thing needed by another. But to gain its food an animal must perform useful service. The fierce rhinoceros, tearing through the undergrowth, lets light and air into the forest. The hippopotamus, browsing on the vegetation that grows in the water-courses, keeps the channels open so that rivers may flow freely and not flood and ruin the land about them. The tall acacia tree is no good as food to the short-necked animals, but it is life to the giraffe. Ants perform good service in the world, but they become so numerous that they are a plague to mankind; and therefore we have strange animals that live by eating ants. In this story we see how curious monsters have their service to perform. They are Nature's outposts, placed, as it were, to keep open the way for man.

SOME VERY STRANGE BEASTS

CONTINUED FROM 878

THIS is our last story about the animals that live on the land. Afterwards we go to the animals that live in the sea, to the reptiles and birds and insects. For this story we have some of the strangest animals in the world. Later we shall have to go over some of our old ground and grow to understand how science has been able to trace the plan of Nature with regard to her family. That will interest the boys and girls who write asking how the animals that we know to-day came to be so very different from what they once were.

Naturally they are puzzled by the disappearance of the terrible giants which formerly lived, and by the growing up of types utterly different from those which in the long ago had the globe to themselves. We shall see in time. We shall try to understand how it was that while in America we had rhinoceroses bigger than those now living, others in different parts of Europe grew so small as to be no bigger than a sheep or pig. We shall see, too, that the elephant, which was once the towering giant of the north, wasted away in Europe to the size of a Shetland pony.

Even here we must have a glimpse of family relations in the animal world to realize how the creatures of the earth came to be what they were. The hippopotamus and the rhinoceros are the biggest animals in the world, except the elephant. Their bodies are nearly as large as that of the elephant, but their legs are shorter. Remember their great size, then you will see how wonderful it is that their distant cousin is the hyrax.

The hyrax is a little animal about the size of a rabbit, which lives in Syria and parts of Africa. It is the animal which is spoken of in the Bible as the coney. David sang: "The high hills are a refuge for the wild goats, and so are the stony rocks for the coney." That is a little animal living among rocks and mountains, yet it is related both to the hippopotamus and the rhinoceros. Though its teeth are small, some of them are shaped like those of the rhinoceros, and it is the link between this great animal and the hippopotamus, the elephant, the tapir, the horse, and the rodent family.

Fancy a horse or an elephant or a rhinoceros living in a rocky hole in the ground as the hyrax does! Of course, that is impossible. But all these animals came from the same stock originally, and the little hyrax has teeth and skull and feet like tiny copies of the rhinoceros, while in some ways its teeth are like the rodent family, which we know

Copyright, 1908, by Amalgamated Press, Ltd.

includes the rat and the squirrel. The hyrax has always lived in Africa and in Asia, but in prehistoric times it also lived in Europe, where its remains are found in the rocks.

TIGERS IN THE ENGLISH JUNGLE AND HIPPOPOTAMUSES IN THE THAMES

Its bigger relations all had their home in Europe, where our forefathers lived. There were tigers in the jungles of England, there were rhinoceroses in the swamps and tangled weeds, and great herds of hippopotamuses sported in the Thames. And man, a poor, puny savage, was there, living in caves, with only the skins of animals to cover himself. We cannot say how long ago this was, but it was many thousands of years. The rhinoceros that the very ancient Britons used once to see was larger than any now living. There were two or three sorts. One of them had two horns, the other had none.

Though the hyrax is only a little animal, it is a first cousin to the rhinoceros, and has hoofs instead of claws on its toes.

There is a two-horned rhinoceros living to-day in Africa very similar to the two-horned one which lived in Europe. Both these varieties lived in England before ever man appeared there. The sort which kept man company in the land was the huge wooly rhinoceros. It had a great horn upon its nose five feet long, and was much bigger than any living rhinoceros. Nowadays the rhinoceros lives, when wild, only in Africa and Asia. The Indian rhinoceros has only one horn. The African rhinoceros has two horns; and there is a smaller type called the hairy-eared rhinoceros, which lives in Burmah. The two sorts in Africa are called white and black, yet both are greyish-black in color. There is no such thing as a white rhinoceros, any more than there is a white elephant. But the African rhinoceros is said to look almost white when the sun shines on it.

If you look at page 61 you will see some old French drawings of what are supposed to be elephants. You will see at once that they are only the size of tapirs, and that the legs are wrongly drawn. The hind legs, for instance, are drawn turning outward like a dog's instead of forward like a man's. There is just as strange a drawing of a hippopotamus, which is shown eating a crocodile, although the rhinoceros and the hippopotamus are both vegetable feeders.

But vegetable feeders can be fierce as well as the meat-eaters. There is nothing in the world more savage than a bad-tempered rhinoceros. Every now and again it seems to go mad. The sight of a man will nearly always make it angry; and if he wounds it, then the great beast will rush at him with such speed that even a fast horse is hard pressed to carry the hunter out of danger. If it catches him, the monster will toss and gore a man to death and trample his body to pieces. Even when not provoked in this way the rhinoceros has fits of passion. Suddenly it will cease feeding and rush at a tree or a bush, and rage until it has torn the bush to pieces or gashed the trunk of the tree through and through. If there should be a man sheltering in the tree, the rhinoceros will try to tear it to pieces so as to get at him.

Its power for mischief lies in its horn, or horns. These grow up from its enormous snout. The horn is not solid bone like the horn of other animals, but a mass of densely pressed hair or fibre, grown solidly together. It answers the same purpose as horn, but it is even stronger. It is wonderfully supported. It does not grow out of the bone of the animal's head, as other creatures' horns grow, but grows up from the skin itself, and a gash from a sharp knife will remove it from the skin.

HOW THE RHINOCEROS IS ARMORED AGAINST ITS ENEMIES

Under the base of the horn the bone of the rhinoceros's head is enormously thick and arched, so that it may resist the heavy pressure which is brought to bear when the animal gives way to one of its fits of rage, and charges at some great tree. If it were not arranged like this, the beast, when thus charging,

would stun himself or smash his skull. It can stand any amount of pressure in a charge; but once, when a rifle bullet struck a rhinoceros on the tip of its horn, the animal dropped so suddenly and lay so still that men rushed up to cut it in pieces, believing that it was dead. But it was not dead. It had fainted, if you can say such a thing of so big a beast. It had been stunned by the sharp shock, so different from that to which it was accustomed. With this horn the rhinoceros can fight its enemies, and it can also obtain food in the jungle and swamp.

But its great strength does not rest all in its horn. It has a power of resisting wounds such as few creatures possess. Its skin is enormously thick —two inches along the back and sides. The hide lies in great folds, and looks very like armor And it really is armor, which Nature has given it. Therefore it need not fear any creature but man and very tiny enemies.

The tiny enemies are flies and insects, which get between the joints of the armor.

Where the great hide folds, the little flies swarm. They find the skin not so tough in there, and bore their way into the giant's flesh. To prevent this, the rhinoceros, which likes to lie in the shade during the day, is driven to the water, where it lies down and wallows, like a pig. It deliberately covers itself with mud, so that those flies which remain upon it are either drowned or suffocated.

There is one other way in which the rhinoceros can obtain relief. He makes friends with a bird, called the rhinoceros bird. This little creature is allowed to walk about the body of the great animal, because it feeds upon the insects which worry the giant. The rhinoceros has sense enough not to hurt the bird, so they have a partnership. The rhinoceros carries upon his body the flies which make a meal for the birds, and the bird comes and pecks them off.

We must remember this when we come to the alligators and crocodiles, which have birds to act for them as toothpicks. The rhinoceros bird is about the size of a thrush, and with its shrill note is said to give the rhinoceros warning of approaching danger. It is always fascinating to watch the rhinoceros and hippopotamus at the Zoo on a quiet day. These two animals, with the elephant, seem to help us to picture the animals of the Old World better than others. The rhinoceros, when it lies or stands still, seems as if it might be some strange carving of rock. The hippopotamus, with its little eyes and ears, and its enormous body, helps the mind to picture the monsters of the dim old days when human life among such

The beautiful giraffe is by far the tallest of all our land animals. Some specimens measure 18 feet from the top of the head to the ground. The color of the giraffe, which lives in Africa is a reddish white with dusky spots of large size. Its favorite food consists of the leaves and young twigs of trees.

frightful monsters as then possessed the earth would have been almost impossible.

If we think of the reindeer and other Arctic animals which lived here, then look at the hippopotamus, which has its home only in blazing hot Africa now, we can understand what changes of climate this land of ours has seen. If the hippopotamus were set up on legs as big as those of a horse, what a terrific beast it would be! Its legs are so short that you can hardly believe that the height of the animal is a little over five feet. It has an enormously thick, oily skin, and beneath the skin is a great layer of fat, which keeps the animal warm in the water.

We do not wonder that such an animal can walk under water, though we feel surprized, perhaps, that it can hold its breath when down below for more than ten minutes at a time. It seems natural that such a monster should sink when it goes into the water, but so marvelously is it adapted to its life that it can swim and dive like a fish.

WHY THE HIPPOPOTAMUS CAN STAY SO LONG UNDER THE WATER

The reason that it can remain so long under water is that it has the power to close its nostrils so that it can retain its breath, and at the same time prevent the water from entering its nostrils. When it comes up to breathe it seems to delight to blow the air just below the surface of the water, with a noise like a fog-horn. In its natural state the hippopotamus loves the company of its fellows, and twenty or more are to be seen together sporting in the rivers. Woe to the boat which ventures in their way. Upon the least provocation, or even without provocation, they will upset the boat and kill the men in it. Their great mouths open like caverns, and they have enormous teeth of such hard, unbreakable ivory that scarcely anything can withstand them.

A baby hippopotamus was captured in the Nile some years ago to be brought to London. While this was going on a big hippopotamus dashed at a man who was sitting at the end of the boat, and with one snap of its terrible mouth bit him right in two at the waist. The young hippo mentioned here was not the first to go to England. The first was a young one caught in Egypt, in the Nile, and seen for the first time in London in 1849. It was the first time that a hippopotamus had set foot in Europe since the days of the Roman Empire, when great conquerors used to exhibit them after some big victory. The first one that went to England was called Obaysch, after the island in the Nile where it was caught. It lived at the Zoo for thirty years, and then died of old age.

HOW THE HIPPOPOTAMUS SAVES THE RIVERS FROM BEING CHOKED UP

You will want to know what purpose such a creature as the hippopotamus serves. It has done important work for geography. With its vast teeth it tears up and eats the great plants and weeds which grow in the rivers. It goes up and down a watercourse in search of food, and acts the part of one of Nature's dredges. If it had not been for the hippopotamus the rivers of Africa would have been choked with vegetation, they would have overflowed their banks and flooded the country round about. Therefore, instead of swift rivers, flowing in proper channels, the water would have run far and wide, making the country round about one vast swamp.

But the hippopotamus is not always man's friend. Where men cultivate the land near the haunts of the hippopotamus the animals go forth sometimes at night, and eat the crops. With their great mouths they mow down the crops as if scythes had been at work. It is another case where animals have been doing man's work until man himself appeared to do it, to cultivate the land in his own way, and to reap the reward which the fruitful earth gives to him that toils. But though the hippopotamus which raids men's fields must be killed, that is no excuse for cruel men who, for the love of slaughter, track the hippopotamus into the wilds and there slay it.

THE GIRAFFE, THREE TIMES AS HIGH AS A TALL MAN

One of the houses at a Zoo which we are always anxious to visit is that in which the giraffes live. No matter how carefully the giraffe may be described, and no matter how good the photographs, its extraordinary appearance cannot be realized unless the animal itself be seen. It is like nothing else in the world. Though the elephant is a great

deal heavier, the giraffe is so tall that the biggest elephant is only half as high as the tallest giraffe. The tallest measure 18 feet from the top of the head to the ground—three times as high as a tall man. The neck, though possessing only seven bones, is extraordinarily long, and set up on high front legs. The back slopes down from the root of the neck to the tail.

The color of the giraffe is a reddish-white, with dusky spots of large size. Once upon a time the giraffe perhaps belonged to the same family with the sheep, oxen, deer and antelopes. But, instead of feeding upon grass and low shrubs as these feed, it found its food in trees, which grow higher. It ceased to feed upon the ground, and in the course of ages its neck became longer and longer, so that it might reach the food which it likes. Its favorite food is the acacia and thorny plants. To reach the acacia it must have a long neck, for this tree has no low branches. But the acacia grows thorns and so do the other trees upon which the giraffe feeds. These thorns, if taken into the mouth or nose, would injure the animal. The giraffe has a special muscle which enables it to close its nostrils. This keeps out the thorns, and also keeps out the sand, which blows in the desert, where it often wanders in its home in Africa. Moreover, the giraffe has a very long upper lip, which is sensitive, like the elephant's trunk, and yet tough. Thorns cannot pierce it. With this long lip the giraffe can pull towards it the thorny boughs; then it shoots out its long tongue, and neatly picks off the leaves and buds which it likes. This tongue is another wonderful instrument. Though long and tough it can be made very pointed at the end.

When an animal becomes specialized in this way it is in danger of sacrificing other qualities. If it feeds high, it cannot easily feed low. So that its food supply shall not fail where trees are scarce the giraffe is able to straddle its front legs wide and bring its head to the ground. The skin upon its chest is loose, to enable the necessary stretch to be made. But the giraffe never feeds in this way if he can help it. He must lower his head, however, to drink.

In a fair fight the giraffe does bravely against a mighty lion. With its hind legs it kicks with enormous force, and so quickly that the eye cannot follow the movements of the legs. The nature of the giraffe is usually gentle, like that of a deer, and the animal will run away rather than fight, except when it is attacked by its own species. It is graceful and beautiful to watch when walking, its long neck swaying like the mast of a gliding yacht. When it runs, however, it is ungainly. Sometimes those at the Zoo indulge in a frolic, and it always makes those who are watching laugh to see their strange antics.

The okapi is one of the latest animals that we have learnt about. It was discovered in Africa by Sir Harry Johnston. No living okapi has yet been brought to America, and it will not live in captivity. The okapi in the picture is stuffed.

Still, when at liberty, the giraffe's gallop serves its purpose. It races along faster than a horse, and the lion cannot catch it on the run. It was long supposed that the giraffe was one of the few living creatures which has no voice. But we know now that the baby giraffe makes a noise resembling the bleating of a lamb and the cry of a young calf. When the old ones are angry and fight, they make a great bellowing. The battles take place when some old king of a herd is challenged by a young giraffe which wants to be king. They dance and caper round each other, rearing and kicking until the young one's strength wears the old one down.

As the giraffe is so different from other animals, it was thought until a few years ago that it belonged to a family quite by itself; that the forms from which it had descended had died out. Only its teeth and one or two other features served to guide us to the story of the way in which it had developed. But

then another of the fairy stories of science came true.

THE SEARCH FOR THE OKAPI

The Congo natives told of an animal which was like a deer and a zebra, and at the same time like a small giraffe. No white man had seen one, nor could they find it, and so they thought at first that the natives were telling one of their stories of animals which do not exist. But the natives insisted that they knew the animal, and that its name was "okapi."

To prove the truth of their statement they brought skins of some of these animals which they had killed for food. These skins were seen to be different from that of any known animal, so a great traveler, Sir Harry Johnston, who knew all about wild animals in Africa, set out to find one for himself. He knew where to look, for he knew where to find the only food the okapi eats, but he did not succeed in seeing one, though he got a skin.

The armadillo is a funny little animal found in America. It has scaly armor almost like a tortoise, but it can run swiftly. It burrows in the ground and lives mainly on refuse.

Major Powell-Cotton, another traveler, spent nine months trying to find an okapi; but he only got the body of a dead one, which a pigmy hunter, a tiny savage man, had killed with his spear.

At length, the Museum of Natural History in New York sent Mr. Herbert Lang and Mr. James P. Chapin to Africa in search of rare animals, and particularly an okapi, for the Museum. They left New York in 1906, and returned in November, 1915, laden with photographs and specimens. They had made their way on foot through dense tropical forests of the Belgian Congo, up the sluggish rivers, and through the great swamps of that unhealthy region, in search of the okapi. They found that it did not live in the swamp as was supposed, but on the higher dry ground in the forest. It comes down each morning to drink in the swamps, and the natives set traps for it and sometimes catch it. Once Mr. Lang reached the spot where a large one had been trapped while it was still alive, but the poor animal, exhausted by its struggles for freedom, soon died. Another time a native, who was a very skilful hunter, brought him a little baby okapi. Mr. Lang tried to keep it alive, but it only lived a week.

The okapi is very shy, and the moment it hears or smells a man in the distance, it rushes off into the deep forest. It is a solitary animal. Two okapis are seldom found together, and the mother okapi hides her little one, and usually leaves it alone. Perhaps it is because of this shyness that this singular species has lasted so long. It really belongs to the same period of the world's history as the sabre-toothed tiger and the giant mastodon, and perhaps there were okapis before ever man appeared on the earth.

THE GREAT FAMILY OF ANT-EATERS, AND THE ECHIDNA

The okapi has legs and hoofs and a body like a deer, but its legs are striped like those of a zebra. Its head is like that of a giraffe, and it has teeth which had previously been supposed to be peculiar to giraffes. Moreover, it has a bony growth upon its head like the horn of the giraffe.

We read all about the echidna in our last story, so now we may follow that up with the family of the ant-eaters, as strange animals as ever lived in the world. The echidna is a much older form of animal than the common ant-eater. Indeed, it is said that the echidna must have been the prophecy of the true ant-eater, which means that from an echidna-animal the ant-eaters are descended. They are South American, and are of three kinds—the great ant-eater, the lesser (about half as big), and a third, a yellow silky toy one of Panama, no bigger than a rat.

The great ant-eater is a big animal, four feet long, with an extraordinary tail, which is another four feet in length. The body is covered with long, brown, coarse hair, while the tail itself has hair so long and thick that when it is put up over the animal's back it serves for an umbrella to keep off the rain and the sun. It has claws which remind you of the claws of a sloth, but the ant-eater has four claws on each front foot, and five claws on each hind foot. The claws

ANIMALS THAT LIVE ON ANTS

The ant-eater is a big animal, four feet long, with an extraordinary tail about the same length. The body is covered with long, coarse hair, and the claws on its fore-feet are so long and sharp that the foot cannot be put flat to the ground, but has to be turned over on its side in walking. It has no teeth, and picks up the ants on which it feeds by means of a long, sticky tongue, and sweeps them into its mouth.

The aardvark is an African animal, and its curious name, given by the Dutch, means "earth-hog." It is a big animal, measuring about five feet in length, and sleeps by day in a burrow, coming out at night to feast among the ant-hills. Its pig-like head and long ears help to give it a very strange appearance.

The pangolin, which is found in Africa and Asia, is covered from head to tail with hard, tough scales, each scale being made of tightly-woven hairs, all joined fast together as in the horn of the rhinoceros. The pangolin lives in a burrow, where it stays all day. It has a long, sticky tongue, and feeds entirely on ants.

The photographs in these pages are by Charles Reid, Lewis Medland, W. P. Dando, and A. S. Rudland

in front are so long and sharp that the foot cannot be put flat upon the ground. The foot is turned over on its side in walking, and the claws curl up, shielded by hair and a pad of flesh.

THE ANT-EATER GOES OUT AT NIGHT AND TEARS UP THE WHITE ANT'S HOME

This big animal has no teeth. None of the ant-eaters has teeth except the aardvark and the armadillo. The ant-eater's mouth is a long, thin snout. From this it shoots out a long, thin tongue, which is covered with a sticky substance. At night the ant-eater rouses itself from its nap and walks off to where the terrible white ants, called termites, have built their great mounds. With its powerful claws the ant-eater rips open the sides of the mound. The ants, frightened at this, pour out, but the ant-eater shoots forth its long sticky tongue, sweeps them into its mouth, and swallows them.

The ant-eater busies itself in this way until the dawn is at hand. Then it scurries off into the bushes and lies down. It has no settled home. It simply lies where it thinks fit. It curls itself up, the head tucked down to the breast, the feet locked together, and the wonderful tail spread all over the body. There it lies in safety, for it looks just like a mass of old hay or dried grass. But should an enemy attack it, the ant-eater will fight. Its front paws are very strong, and with these it gives a terrible blow.

THE ARMADILLO, WHICH DIGS MORE QUICKLY THAN A MAN CAN

The armadillo is not a true ant-eater. Insects form only a small part of its diet. It will eat almost anything—vegetables, grain, insects, and flesh, good and bad. The armadillo is really one of the useful scavengers of South and Central America. It helps to eat dead bodies of animals, or parts of animals, which men throw away, which, if left, might cause fever near human dwellings. It is a singular beast. It has scaly armor almost like that of a tortoise, but its head does not need to be drawn into the shell; the armor covers it right down to the nose. Its legs are free, and it can run with great swiftness. Upon its feet are powerful claws, with which it can burrow faster than a man can dig. If you try to dig one out of the burrow in which it hides by day it burrows deeper and deeper while you are digging.

A man made up his mind one day that he would have an armadillo, no matter what happened. He got it in the end, but he had to dig for eight hours, and in that time had to sink six deep pits, one after another. There used to be giant armadilloes, but it is the smaller ones with larger brains which have lasted down to our own day.

The aardvark, as we have seen, is a true ant-eater. It is an African animal, and its name, given by the Dutch settlers, means "earth-hog." It is a big, heavy animal, five feet in length, including the tail, which may measure eighteen or more inches. It sleeps by day in a burrow, and comes out at night to feast among the ant-hills. It has legs better adapted for running than the ant-eater has, and its claws are so big and powerful as to be like hoofs. Its pig-like head and long ears give it a very strange appearance.

THE PANGOLIN, WHICH HIDES BY DAY AND HUNTS BY NIGHT

But there are more ant-eating animals than these. There is a small one which lives in the trees and has only two toes, like one of the sloths; there is a scaly ant-eater which carries its little ones in a pouch, and lives in Australia. Then there is the pangolin, which is a near relation of the aardvark. It is covered from head to tail with hard scales, each made up of tightly-woven hairs, all fast joined together.

There are several forms of pangolin, and they are to be found in Africa and Asia, but not in America. They all have the sharp claws and long, sticky tongues of the ant-eater. Their claws are splendid for their proper work, but they are not of much service for running, so the pangolins keep to their burrows by day and hunt by night.

We should not know what to do with pangolins in America but in the parts where they live they are a blessing to men. The ants are one of the greatest nuisances of hot countries. They eat men's food and clothes, their books and furniture, and they bite men, too. The ant-eaters are good friends in ridding men of these little enemies, and should not be killed.

THE NEXT STORIES OF ANIMALS BEGIN ON PAGE 1067.

WHAT THIS STORY TELLS US

WE have read of the tiniest living things, and we know how wonderful and important in the world are the microbes the eye cannot see. We learn here something more about the microbe, something that helps us to understand the oneness of all life. The microbe is the simplest thing that is alive, and it is made up of a single cell. Everything alive is made up of cells; just as the house is made up of rooms, just as a family is made up of people, just as the whole of anything is made up of parts, so every living thing is made up of parts, and these parts we call cells. These cells are the very beginning of life; we cannot trace life farther back than the cell. A boy, or a girl, or an oak-tree, or a spider, is made up of millions of cells, but a microbe is nothing more in itself than just one cell. We learn this here, and we learn, too, that the life in this single cell seems very like the life in you or the life in anything we know.

THE SIMPLEST KIND OF LIFE

CONTINUED FROM 909

WE have been talking lately about the tiniest living things. These are very different indeed from our own bodies, and some of them are the greatest enemies of our bodies; but we had to talk about them early in our study, because without their life no higher life would be possible. Another important reason for doing so is that life in all respects apparently seems one and the same, and that, if we are to study life properly, we should begin with it in its simplest forms.

Now, each microbe is a single living cell, and the microbe is therefore interesting not only on its own account, but also because all living creatures are made of living cells, and so, if we study the life of the microbe, we are preparing ourselves for the study of higher forms of life.

Every creature that exists, a moss, or a man, or a microbe, or a monkey, or a fish, is made of living cells, but if we survey the whole world of life in this fashion we find that a very great division can be made. In the one division are creatures that are made simply of one cell, and in the other are those made of more than one cell. The one-celled creatures were certainly the first to appear on the earth, and we have already learnt a good deal about them. We need the microscope to see them with.

The many-celled creatures are all the visible world of life, animal and vegetable; but though there is such a vast difference between, shall we say, an oak-tree and a microbe—the first made of countless billions of cells, and the other made of only one—and though the difference is a thousand times vaster than any question of numbers of cells, yet we find that the living cell in each is astonishingly similar, whether it is the single cell of a microbe, or a cell in the leaf of an oak-tree or in the skin of your hand, or anywhere. If we could learn the secret of the cell, we should have the secret of life, and the first great lesson we have to learn is the great lesson of oneness in different things.

It is true to say that all wisdom, in every branch of knowledge, is more truly wisdom the more truly it sees the one in the many; and there is no more striking case of this than the world of life with its infinite variety—they say there are 80,000 different kinds of beetles alone. Yet the more carefully we examine this measureless variety, the more clearly do we see that it can all be reduced to the wonderful powers of one unit, and that unit is the living cell.

In everything we study, we desire to find the simple things that make up what we are looking at. Let us take one or two instances. When we

Copyright, 1908, by Amalgamated Press, Ltd.

study nations and peoples, we try to find out what it is that they are made of. We learn that they begin in the family—father and mother and children living together, and so we cannot know too much about family life. Or, when we are studying matter, we must find out its elements, if possible, and we know that matter is made up of atoms.

THE LIFE OF THE AMŒBA, THE HUMBLEST ANIMAL ON THE EARTH

When we study atoms, as we do in another part of this book, we find that they, too, are made up of still smaller things, which have something to do with electricity, and are called electrons. So we say that the unit of a nation is the family, that the unit of matter is the atom, and that the unit of the atom is the electron.

In the same way, then, we find that all living matter is made of cells, and so we say that the cell is the unit of life. We cannot know too much about it. Already we have studied a number of cells closely resembling one another, which we call microbes. Wherever we turn in the world of life, we find cells and yet more cells. Having looked at the cells which form the bodies of the simplest plants, we may now look at the simplest kind of animal, especially because the cell which makes it is what we call a typical cell—that is to say, it has all the characters of cells in general.

This humblest of animals is called the amœba, and is readily found in ponds; it simply consists of a single cell, which we will read about now. Remember, meanwhile, that we are really describing a kind of thing which not only makes the amœba, but is found in the bodies of many other creatures. For instance, our own blood contains countless millions of cells, which are very like the amœba in almost every way. Instead, then, of mentioning the amœba again, we will simply speak of it as the living cell, and understand that what is said is true of ordinary cells in general.

THE LITTLE BALL IN WHICH LIFE MAKES ITS HOME

Microbes are not quite typical cells, for the typical cell is more or less round, like a little ball. Many cells are bounded by something which we call the cell-wall. The cells of animal bodies are very often without this cell-wall; most of the cells of our own bodies, for instance, have no wall. But when cells were first discovered by the microscope, it was in plants that they were seen; and most plants do have a cell-wall, which is rather tough and hard, and is not itself alive any more than the shell of a snail is itself alive, but it has, of course, been made by the living cell. There is a particular kind of stuff out of which the plant makes its cell-wall, and the name cellulose has been given to it.

When cells were first seen in plants, the cell-wall was so conspicuous that men thought it was the important thing, and they thought that what was inside of it was mere food material or fluid. But now we know that many cells have no cell-wall, and that the wall is merely what the name suggests—a means of protection for the living matter inside. Cellulose is a tough substance, which our stomachs cannot digest; and now we can understand why we cannot digest a raw potato. The potato consists mainly of starch, made and stored up by the living cells of the potato; it is stored up by them inside their cell-wall.

A ROUND SPECK OF MATTER THAT MOVES BY ITSELF AND IS ALIVE

If, then, you eat a raw potato, the starch is shut up inside walls of cellulose, which the juices of your stomach cannot break down; but when the potato is cooked the cellulose walls are burst, and then our digestive juices are able to get at the starch and turn it into sugar, which passes into our blood and gives us strength. That is all we need say about the cell-wall, and now we must turn to the really living part of the cell.

Let us go back to the amœba. This has no cell-wall. If we watch it under the microscope, which is not a difficult thing to do, we shall see a very good reason why it should not have a cell-wall. The amœba is just a round speck of living matter, but it can move "of itself," as we say. You know already that movement is usually a mark of living things, and this amœba, like most cells, can move itself bodily about. It does this by crawling. It swells out one side of its body, and then pulls the rest of its body after it. It cannot crawl as quickly as a worm, but it can crawl.

Of course, if the amœba had a stiff wall round it, it could not crawl; and as it crawls it is bound to change its shape,

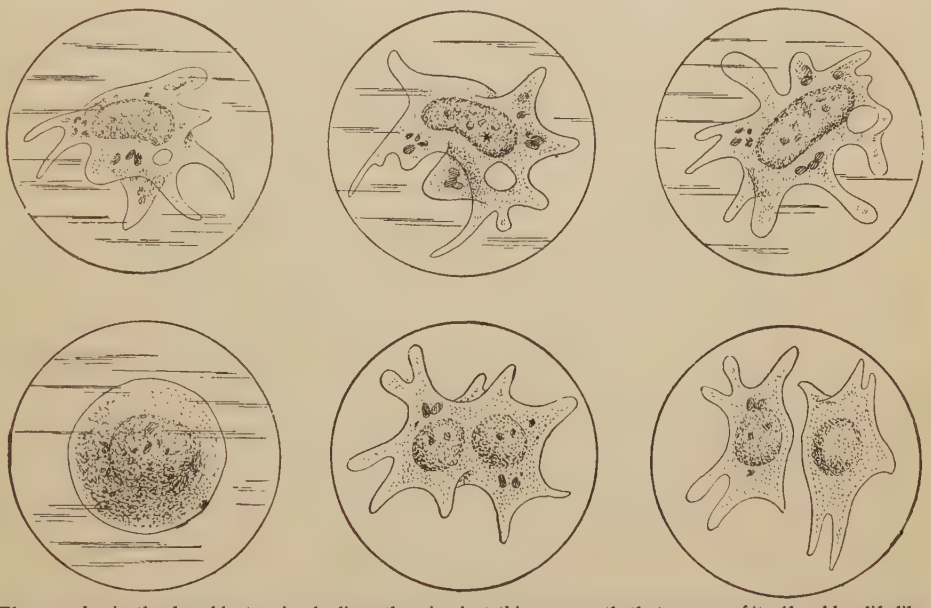
and so, though we call it round, when the amœba is active and looking for something to eat, it is not round, but has an irregular shape which changes from moment to moment. It is only round when it is starved, and almost dead, or perhaps when it has had plenty of food and is resting after a meal.

But we now know that there is a very simple way of making an amœba stop moving and become quite round, and this way is very interesting because it teaches us that all life is the same everywhere. You have no doubt heard of chloroform. This is a liquid, looking rather like water, but with a curious odor, which is given to people to inhale when perhaps they have had a finger crushed, and the tip of it has to be taken off. It sends them to sleep in a peculiar way, so that they feel no pain. This is because the chloroform acts on the cells of their brain and makes them stop working; but in the chief matters all cells are really the same, and all true poisons, like alcohol, chloroform, prussic acid, and so on act on all cells alike.

So, if you are watching an amœba crawling under the microscope, and you add the very tiniest amount of chloroform to the water in which it is moving, it is poisoned; it stops moving, and, so to speak, curls itself up into a round ball.

Of course, if you give too much chloroform, the amœba will be killed, just as a man would be killed if you gave him too much chloroform. But do you not think it is very interesting that the same stuff should act in the same way upon every kind of living cell? I do not want you to imagine that the cells in our brain look like the amœba, or that they crawl about; they have a very different business. Nevertheless, they are alive, and the point is that all living cells everywhere, whatever their business is, have their life arrested if they are chloroformed, because in reality all life is one and the same. If this teaches us nothing else, it should teach us to respect all living things, and to remember that, though they may be very poor and humble relations, yet they are truly relations of ours.

THE SIMPLEST THING ALIVE ON THE FACE OF THE EARTH AND HOW IT CHANGES SHAPE



The amœba is the humblest animal alive, the simplest thing on earth that moves of itself and has life like ours. These pictures show what an amœba is like. The three pictures at the top show an amœba floating in a drop of water, much smaller than a pin's head, and shows how it changes shape in a minute or two. The first picture in the bottom row shows how the amœba changes into a solid mass if touched, and the last two pictures show the amœba dividing so as to make two; both alive and in every way the same as the one.

THE NEXT PART OF THIS IS ON PAGE 1121.

ST. FRANCIS AND ST. NICHOLAS

In Assisi, in Italy, in the thirteenth century, lived the son of a wealthy merchant, who is remembered to-day as St. Francis. He spent his youth in vanity and foolishness, until there came to him a vision which brought his folly to an end; and Francis cast aside his wealth and lived a life of sacrifice. This picture shows St. Francis among the birds, because he loved to be among them, speaking of them as his friends.

A rich young man named Nicholas, walking through the streets of his native town, heard a sad tale of the distress of a starving father and his daughters. Nicholas hurried home, and at night took a bar of gold to the poor man's house, thrusting it through the window. So many other gifts of love did Nicholas, that he has been named St. Nicholas, whom we call Santa Claus. This picture shows St. Nicholas with the children.

STORIES OF THE SAINTS

A SAINT is a good man or woman whose life has been spent in charitable work, in devotion to God, and in true repentance for any sin. In olden times, when nearly all Christians were ruled by the Church of Rome, many noble men and women, whose lives had been full of goodness, were, after death, made saints by the Church, or "canonized," and a day of the year fixed for paying reverence to their memory. In time many beautiful legends, partly true but largely imaginary, came to be told about these saints, and these legends are well worth reading, even if we only regard them as beautiful stories. Here we read of the lives of some of the best known of these saints.

THE LITTLE POOR MAN OF ASSISI

CONTINUED FROM PAGE 872

THERE lived in the town of Assisi, in Italy, in the thirteenth century, the son of a very wealthy merchant, and his name was Francis. He was a handsome, bright-eyed, merry-hearted boy, and as he grew up to manhood he lived only for pleasure and excitement. He became famous for the wild way in which he spent his money, and even set himself to outdo the sons of noblemen in grandeur and vanity.

But in the midst of his wild and foolish life there came to him a voice from heaven, and he saw all at once how foolish and vain he had been, for it is a madness to take delight in rich raiment and to think only of bodily pleasure, when every day we live only carries us nearer to the mystery of death.

Francis gave up his mad ways and set himself to serve Christ. He tore off all his rich clothes, and lived like a beggar. His father was furious. His old companions pelted him with mud. Nearly everybody thought that he was mad. But some people began to perceive that Francis was indeed a disciple of Christ. For he did not rave, he did not shout, he did not make himself a fool in people's eyes. No, he was the same cheerful, bright-eyed, happy-minded man, but with this difference—that all his cheerfulness came from love of God.

And this was the secret of St. Francis. He adored poverty. If, said he, Christ became a poor carpenter's son for us, surely we ought to make ourselves poor for Him. And he found a deep joy in poverty. He spoke of poverty as a lady, and said he had married this beautiful lady of poverty. He wore a rough brown dress, ate simple food, and spent all his time in teaching people not to desire riches and greatness, but to desire poverty—that is to say, to love God so much that everything rich and grand and magnificent appears silly and trivial and unworthy.

His love for God included love of the beautiful earth which God has made. He hated cruelty. He told people to love "our sisters the birds," and even spoke of the wind as "our brother," and the rain as "our sister." He felt that all things are brothers and sisters, and that God is the Father of all.

For six hundred years men have loved St. Francis, whom we call the Little Poor Man of Assisi. He has taught us all, the wicked and the foolish, that we *can* change and *can* become good, that we can grow to resemble the beautiful and sinless Christ.

St. Francis is dear to us for many reasons: but perhaps we are grateful to him, more than for any other of his virtues, for just this simple teaching—that we should never be unkind to bird or beast, but should treat them all as brothers and sisters, and spread the love of God among all living things.

THE GIANT WHO CARRIED THE POOR

HOW OFFERO BECAME ST. CHRISTOPHER

AN old hermit was sitting in his cell one day, when there appeared before him a mighty and huge man, who said his name was Offero, and told him the strangest of stories.

"I was strong from my youth up," he said, "and beat every comer at games and sports. But I wearied of these idle things. A voice within me drove me forth, and would not let me be satisfied.

"So I put on my armor and took my sword, and journeyed till I came to the palace of the greatest king on earth. Him I served, until one day I saw him make a sign on his forehead whenever the minstrel who sang before him made mention of the Evil One. I would not serve him longer, because he feared the Evil One, and was not a brave man. So I journeyed on, till in the centre of a deep, dark forest I found Satan keeping his court.

"'Art thou the bravest king on earth?' I asked. And when he said that he feared nothing, I took service with him.

"But one day I saw him cower from a little wooden cross set up on the highway, and I challenged him, saying:

"'What! are you the bravest man on earth, and fear a piece of wood?'

"'It is not the cross I fear,' said he, 'but Him who once hung there.'

"So I left him, and have ever since striven to discover who is this Christ who hung upon the cross. And now the voice within me has brought me to you. Tell me, I pray you, the story of Christ."

The hermit told him, and the giant lifted his great sword to the sky, and swore that he would henceforth serve only Christ. The hermit said that Christ did not wish men to fight for Him, but to fight against evil by gentle living and prayer.

Offero said that might well be true; but it was evident that God had not given him great muscular strength for nothing, and that strength he would devote to Christ. So the hermit took him to the banks of a wide and angry river, and bade him dwell there and help poor people to go across. This pleased Offero well, and he built a hut, and tore up a pine-tree for a staff, and when poor people wanted to cross the angry flood he carried them over, and said he did it for the love of God.

One wild night a little child came to him to be carried across, and Offero set him on his shoulder and waded into the foaming stream. But as he went the child grew heavier and heavier, so that Offero's knees bent under him. Yet he got across, and when he set the child down he said:

"How is it that you are the heaviest burden I have ever carried?"

Then the child became glorious with a wondrous light, and said to Offero:

"Heavy did I seem to thee because I bear the sins and sorrows of the whole world. I am Christ. And because thou hast been kind to the weak, and hast borne Christ upon thy shoulders, I will call thee henceforth Christopher."

Then the Child vanished, and Christopher kneeled in the darkness.

ST. URSULA & THE TEN THOUSAND MAIDENS OF BRITAIN

A MOST wonderful sight was seen one day in Brittany. In a great meadow were gathered together more than ten thousand of the loveliest maidens from Britain, and on a throne was seated the Princess Ursula of Brittany, telling these British maidens the story of Jesus Christ.

Princess Ursula was the only daughter of the King of Brittany, and so lovely that the story of her beauty had passed into all lands. Prince Conon of Britain desired her for his wife, and she told him to send her ten of his greatest ladies, each escorted by a thousand maidens, and to wait for her three years. Then she taught these ladies to be Christians, and set out with them to visit foreign lands, while Prince Conon at home gave himself up to a study of Christ.

Princess Ursula and her great company of ladies made a wonderful impression wherever they went, and many people became Christians because of them. And Prince Conon's love waxed so strong that he came and followed her, with many great bishops and clergy, including even the Pope of Rome. And Conon longed for the time when Ursula would be his bride; yet was he very

ST. CHRISTOPHER AND ST. URSULA

Offero the giant once stood at the edge of an angry flood, when a child came to him to be carried across; he set him on his shoulder and waded through, but the child grew heavier, and became glorious with a wondrous light, and said, "Heavy did I seem because I bear the sins and sorrows of the world. I am Christ; and as thou hast been kind to the weak, and borne Christ upon thy shoulders, I will call thee Christopher."

The beauty of Princess Ursula, the only daughter of the King of Brittany, was known in all lands, and the princess and her ladies went everywhere to tell men of Jesus. One day they came to the court of a king whose wickedness Ursula denounced so bravely that the king seized an arrow and shot it into her heart.

happy to go across the world with her, spreading knowledge of the blessed Savior. And Ursula loved him, but she knew that God had a great work for her to do. So they all went together, telling people of the love of Christ.

But in this pilgrimage Ursula came to a place where the heathens of the land rose against her, and they slew the bishops and clergy, and Prince Conon and his knights, and all the women except Ursula, whose lovely face dashed the courage of the most brutal men, and stayed the hands of the most savage.

So Ursula was brought before the king, and he said he would marry her; but she spoke to him so truly of the wicked murders he had done that he himself seized an arrow and shot it into the heart of Ursula. And thus it was that Ursula came into heaven last of all that shining host who had gone across the world at her bidding with the message of Christ's love.

ST. CATHERINE, THE GIRL WHO DEFIED AN EMPEROR

A COMMON sight at a celebration such as Independence Day is the Catherine-wheel. It is a wheel made up of a wooden hoop with sticks for spokes, and little rockets all round the rim, so that when fixed to a wall and lit the gunpowder inside the rockets lights and hisses and spouts sparks, and causes the wheel to revolve, so that it looks like a ring of brightly-colored fire.

The Catherine-wheel gets its name from a saint who was bound to a wheel. It was Saint Catherine of Alexandria. She was a Christian, and the cleverest girl in Egypt of her day. She lived in the fourth century, when most of the people about her were heathen. One day she heard that the Emperor Maximinius had ordered that many poor people should be slain as a sacrifice to the idols the emperor worshipped, and Catherine went to his palace and condemned his cruelty and stupidity.

It was in vain that he tried to argue with her. She was too clever for him, and what she said was too just and right to be affected by anything that he could urge. So the emperor sent for all his wise men to argue with her. They were as helpless as he had been. She defeated them all in a great debate, and many people became Christians on hearing her wonderful words. This made the emperor angry, and he ordered that she should be put to death—tortured to death on a wheel.

What this wheel was like we do not now exactly know. One account says that it was shaped like an ordinary wheel, but armed with spikes, which hurt her at every movement. Another account says that it was not one wheel, but four wheels joined, armed with teeth. Whatever the nature of the wheel, poor Catherine was bound to it. But a wonderful thing happened. No sooner had she been tied to the wheel than an angel appeared—so the story in the old books runs. The angel loosed her bonds and set her free. He broke the wheel in pieces; he killed the man who had invented it, and destroyed also several of the cruel people who had gone to see the brave girl tortured. Those who escaped ran away, crying, "Great is the God of the Christians! He doeth wondrously both in the heavens above and in the earth beneath."

But the wicked emperor was not content. He had Catherine beaten with scourges, and caused her to be cast into a dark dungeon and kept without food for twelve days. But in her sorrow there came to her comforting visions and healing for her wounds, and the stories say that a dove brought her food.

At the end of the twelve days the emperor had Catherine led forth, and ordered his executioner to strike off her head with a sword, and so at last she died.

That is the story which the old books tell. We need not believe it all as having happened exactly like this. People did not then write history at the time that events happened. For years and years a story would be told by word of mouth, and by the time that it first came to be written exaggerations and mistakes would creep in.

But it is certain that St. Catherine was tortured on a cruel wheel, and that she escaped from it with her life. The old pictures of her show the wheel as her symbol, and to this day we get the name of the Catherine-wheel, which all boys know, though perhaps neither they nor the firework-makers know how the name came about.

ST. CATHERINE BOUND TO A WHEEL

Long ago in Egypt, Catherine of Alexandria went to the emperor and rebuked him for his cruelty to Christians. The emperor ordered that Catherine should be put to death, and she was bound to a wheel armed with spikes, and cruelly tortured. Catherine escaped from the wheel, as told on opposite page, but was beaten and thrown into a dungeon, and at the end of twelve days the emperor ordered her to be beheaded with a sword. The firework known as the Catherine-wheel gets its name from the wheel to which she was bound.

ST. BENEDICT, THE BOY WHO FLED FROM ROME

MANY years ago there was a wealthy family in Italy, and the only son was the pet of the house, on account of his pleasant, cheerful manners and the brightness of his understanding. His parents wished him to become a judge, and while he was yet a youth they sent him into the great and mighty city of Rome to study law. But the boy, whose name was Benedict, found Rome a dreadful and a wicked place; he was shocked by the luxury that met his eyes, and by the light, flippant, and very often evil conversation which reached his ears. Instead of thinking about the law, he thought about this wickedness, and wondered what God must think of the city of Rome. So greatly was he shocked by the wickedness of the city that he ran away from it, and hid himself in the hills, determined to serve God in silent loneliness. But his old nurse, who loved him dearly, followed Benedict, and waited upon him with tender care. For a long time he lived in this manner, until it seemed to him wrong that he should let this old woman fetch him food, and once more he ran away. This time he traveled far into the mountains, and lived in a wild and savage cave. He did not escape temptations in this lonely life, and once he was so frightfully tempted to return to Rome that he flung himself naked into a thorn-bush and rolled in it till the pain had driven all evil thoughts out of his mind.

Many years passed, and people heard of the holy man living alone in a cave and thinking only of God. They came and visited him. A company of monks were so impressed by his preaching that they asked him to come and rule over them, and this he consented to do. But Benedict found that the monks lived too easily, and he introduced a greater sternness into their lives. Then the monks repented that they had ever asked him to be their superior, and, we are told, poisoned some wine and presented it to Benedict. But Benedict was warned, and he made the sign of the Cross over the wine, and the cup fell to the ground and was shivered into fragments. Then Benedict returned to his cave, and many holy men came to live near him; and he built houses for them to live in. These monks had to desire three things—poverty, purity, and obedience—and they had to agree to work several hours every day with their hands. St. Benedict caught a fatal fever in nursing the poor, and while he was dying he bade his followers bear him into the chapel, where he died before the altar.

Many years ago the son of a wealthy family in Italy ran away from Rome, frightened by its terrible wickedness, and became a hermit. A small company of men followed him to the mountains, where they lived together pure lives, seeking only the glory of God. And in many parts of the world to-day men still live as followers of Saint Benedict, whose portrait this is.

ST. NICHOLAS, THE REAL SANTA CLAUS

A YOUNG and rich man was walking one day through the streets of his native town, when he heard sounds of lamentation from the house of a nobly born man whose money was all lost and who was now living on the verge of starvation with his three daughters. The young man listened, and he heard a girl's voice say:

"Father, let us go into the streets and beg, for it is hard to starve."

Then he heard the proud father make answer:

"Not yet. Not to-night. Let us wait one more night. I will again pray God to save my children from such disgrace."

Nicholas hurried home. Among the treasures he had inherited from his father were three bars of solid gold. He took one of these bars at night to the house of the poor man, and finding an open window, which he could just reach by standing on tiptoe, he thrust in the bar of gold and departed. Then he came a second night, and left the second bar; and the third night, and left the third bar. But the third night he was discovered, and the poor father, who believed that the gold had come from Heaven, knelt at his feet. Nicholas lifted him up, and said:

"Give thanks to God, for it was He who sent me to you."

This and many another splendid gift of love did Nicholas in the name of God and always in secret, so that he is called St. Nicholas, and we say that he comes to children on Christmas Eve and fills their stockings with gifts for the sake of his Master, the Lover of all children and the Savior of mankind.

ST. AGATHA, THE BRAVE MARTYR-GIRL OF SICILY

QUINTIANUS, the Governor of Sicily, was in love with a very beautiful Catanian girl named Agatha.

She was proudly bred, and of rich parentage; so that when she avoided him, and even ran away to a distant city, he thought it was her pride that governed her. But presently he discovered the truth. Agatha was a Christian.

The governor sent soldiers, and had her brought before him. For a long time he pleaded with her earnestly to give up her religion; but she remained faithful.

Then the love of Quintianus turned to a most hideous hatred. He had the beautiful girl, whose faith he could not shake, cast into a dungeon. Then she was stretched upon the rack, and the cords were tightened, till her bones started. But she clung to Christ, and would not be persuaded to deny her faith.

Then the inhuman monster who had been her lover used the sword upon her, and she was thrown back into her prison terribly wounded. No doctor was allowed to see her, no nurse to tend her. But as she lay on the ground of her cell no cry or moan escaped her lips. Instead, a lovely smile of happiness overspread her face, and in a great peace she sighed out her soul to the Lord Jesus Christ.

Such was the faith of this girl. Like all the company of saints, she was so sure of Christ, so certain of Eternity, that no agony could affright her, no death could appal her.

ST. CRISPIN, THE PATRON SAINT OF SHOEMAKERS

THE patron saint of shoemakers is St. Crispin, and the reason is this.

In the third century there lived at Soissons, a small town of Italy, two natives of Rome, two brothers, Crispin and Crispinian.

They were teachers of Christianity; but they thought it right to earn their own living, and this they did by the making of shoes. They charged money to the well-to-do, but for the very poor they made these shoes without charge of any kind.

Their fame spread, and many of the people in Gaul visited them, and learned from them the story of Christ's love. At last there came to Soissons the heathen emperor, and he commanded that these shoemakers should be arrested, and they were tried, tortured dreadfully, and afterwards beheaded.

Whenever you see the picture of a saint with the palm of victory in one hand, and in the other an awl, you may know it is either Crispin or Crispinian, the patron saints of shoemakers.

ST. CECILIA, THE SWEET SINGER OF ROME

THERE was a strange scene one day in the city of Rome when it was a crime punishable by death to be a Christian. A handsome young Roman soldier, by name Valerian, had just brought home his bride, a very beautiful and proudly bred Roman girl, named Cecilia. The festivities were over. The guests had all gone. Valerian was alone with his bride. Then Cecilia said to him:

"I am your wife, but I do not belong to you. I belong to Christ. All my life up I have given myself to Christ, and I have a guardian angel who will guard me from evil."

Valerian was much surprized, for he had no idea that the noble parents of Cecilia were among the despised Christians.

"Show me this angel," he said to his wife; "then I shall know if what you say is true."

She told him that he could not see the angel until he had learned to love Christ, and bade him go along the Appian Way, outside the city walls of Rome, and ask the poor people who lived there to direct him to Urban the Good. This Valerian did, and he found Urban living underground in the Catacombs. Urban told him the story of the Fatherhood of God and the Sonship of Jesus Christ, and Valerian believed and was baptized. So happy was he in his new faith that he persuaded his brother also, and these two, with the beautiful Cecilia, spent their lives in doing good to the poor. The home was very happy, for Cecilia had a lovely voice, and she sang songs to God which thrilled the hearts of the two brothers, and they knew that after death they would all meet in a happier world.

St. Cecilia, whom this picture shows playing on the organ, became a Christian in the great days of Rome, when Christianity was despised, and she and her husband, a handsome young Roman soldier, spent their lives in doing good. Then she was condemned, and died a terrible death, singing.

Soon it became known that Valerian and his brother were Christians, and they were put to death. But Cecilia became bolder in preaching, and was brought before the governor.

"What sort of a woman are you?" he asked roughly. "And what is your name?"

"I am a Roman lady," she replied proudly. "Among men I am known as Cecilia, but my name is Christian."

Then she was condemned, and they carried her away to her own house, and placed her in a bath of boiling water. She was then bound, and a sword descended upon her neck, but did not sever it. For three days she lived, giving all her money to the poor, and singing praises to God; then she died, and was called ever after St. Cecilia.

THE NEXT STORIES OF MEN AND WOMEN ARE ON PAGE 1167.

WHAT THIS STORY TELLS US

JUST as a heap of sand is made up of grains of sand, so a glass of water is made up of drops of water. In these pages we learn what a drop of water is. The tiniest drop of water that it is possible to have, so small that we cannot see it with our eyes, is called a molecule, which means *a little mass*, and is the word used for the smallest part we know of any compound. A molecule of water, everywhere and always, whether in your body, or in the air, or in the sea, or in the form of ice, or in the air of the planet Mars, is made up of three pieces joined together, and no drop of water can exist without these three parts, which join together to make a molecule of water. Here we learn what a molecule of water is made of. It is made up of two kinds of gas—two parts of hydrogen and one of oxygen.

WHAT WATER IS MADE OF

CONTINUED FROM P. 958.

IF you take a heap of sand, you know that it is made up of tiny grains, each of which is itself a grain of sand. Now, in exactly the same way, if you take a tumbler of water, it is made up of tiny little parts or particles, each of which is a particle of water; and the whole bulk of the water is just made up of a number of these as the heap of sand is made up of grains of sand. These particles of water are so small that, if you could imagine a row of them, it would certainly need many millions of millions of them to stretch out as far as an inch.

Now, there is a special name for these tiny parts or particles of anything, and as this name is used all over the world in describing them, we must learn it. The word is *molecule* — pronounced molly-cule — and it is the Latin name for a *little mass*. Now, I am sure you will understand that if we want to find out what water really is, the best way for us would be to take one of these molecules—in imagination, for, of course, they are far too small for us to do it in reality—and find out what it is made of. This is, of course, really impossible so far as one molecule is concerned. Nevertheless, we are absolutely sure of what we should find if we were able to take one molecule of water and pull it to pieces.

Now, let us imagine that we have this molecule before us. The first thing we find is that it consists of three pieces. Every molecule of water, everywhere and always, whether in your body, or in the air, or in the sea, or in the form of ice, or in the air of the planet Mars, consists of these three pieces joined together. Otherwise it would not be water, and nothing else is water, however much it may look like water. That is one of the things we are absolutely certain of.

Further, because water is always made of molecules consisting of these three parts, all water everywhere, on the earth, or on Mars, or on a planet belonging to some other sun than ours a million million miles away, always behaves in exactly the same way as all other samples of water. It has its laws, which depend upon its nature; and as its nature is the same everywhere, so its laws are the same everywhere. We can watch the snow-caps of Mars melting under the influence of the sun's heat, just as snow melts on the earth.

Everywhere in the universe, water under the same conditions will boil in the same way, will melt in the same way, will freeze in the same way, will dissolve the same amounts of the same things, will form drops in the same way, will have exactly the same properties of every kind; simply because whenever and wherever you find water it is one and the same thing.

Now, what are the three parts of which the molecule of water is always made? This is, on the whole, the most important molecule of any kind

Copyright, 1908, by Amalgamated Press, Ltd.

that we know in the universe, and as it is also one of the simplest, it is a good one to begin with; and, even supposing all the three parts had different names, it would not be too much to expect you to learn them, considering what an important thing water is. But, as a matter of fact, two of these parts are the same as each other, and so our lesson will not be a difficult one. The picture on the next page is an imaginary picture of the way in which a molecule of water is made.

WHAT A MOLECULE OF WATER WOULD LOOK LIKE IF YOU COULD SEE IT

I say an imaginary picture because, though we have drawn the three parts as if they were round, we really know nothing about that, since we have never seen them. We do know that they exist, and that by some power or other they are held together. We also know, by the way, that this power is extremely strong, because it takes great trouble and effort to break up a molecule of water; that being the reason why for so many ages men thought that water was an element.

Now, you must understand what this diagram is. It is a single part, or molecule, or unit of water. A lot of water—like a tumbler of water or the Atlantic Ocean—is made up of a number of these molecules taken together. But a single molecule is the smallest possible portion of water that can exist. If you break it up so that its three parts do not hang together, then it is no longer water at all, but is simply a mixture of the two kinds of stuff which make up water. This we must be quite clear about, for it is the difference between a *compound* and a *mixture*, and that is one of the most important differences in the world.

HOW TO MAKE ONE O CATCH HOLD OF TWO H'S

If you had in a jar—and this is quite easy—a number of the kind of things marked H in the picture, and also a number of the kind of things marked O, and even supposing that you had twice as many of the H as of the O, so that the proportion between the two was the same as it is in water, yet that jar would not contain water, but only a mixture of the stuff called H and the stuff called O. That mixture would not be water, and would not look like water; and the astonishing thing is that, even at the ordinary temperature of the room, this mixture would not be liquid at all, but just a mixture of gases, and by looking as it you could not possibly tell it from that other mixture of gases which we call air. In a little while we shall see how it would be possible to do something with this mixture of H and O so as to make every O catch hold of two H's and form a molecule of water; and then, instead of the mixture of gases that we had before, we should have a tiny drop of water, and this water would actually be made out of that mixture of gases.

Now, that is what water is—a compound made out of the two gases which up to now we have called by the first letters of their names, H and O.

Now, what do H and O stand for? First of all, let us take O, because we have heard more about it already. O stands simply for the gaseous element *oxygen*, which we talked about in connection with the air; oxygen is the most important thing in the *mixture* of gases called the air, and it is the most important thing in that *compound* of two gases which we call water. In the drawing the artist has made the O very big indeed, and the H's quite tiny, for each O really weighs as heavy as sixteen H's. Therefore, though there are two H's to one O in every molecule of water, O, or oxygen, forms eight-ninths of all water, which is made up of one part of H and eight parts of oxygen.

EACH MOLECULE OF WATER HAS TWO ATOMS OF HYDROGEN & ONE OF OXYGEN

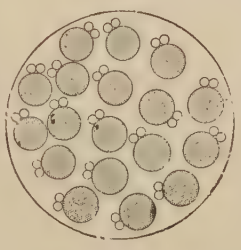
I hope this is quite clear. If each H weighs one-sixteenth part of one O, then in anything made up of two H's and one O you will have sixteen parts of O and two of H; which equals eight parts of O and one of H. This is the same as saying that eight-ninths of water is made of O, or oxygen, and one-ninth of H.

Now, what is H? H stands for another gas, called *hydrogen*, and hydrogen is really a very good name for it, and tells us what it is, for the word simply means the thing that *produces water*, and H, or hydrogen, is simply the gas with which oxygen produces water. Only it will not do for them to be merely mixed, but they must be *combined*, and they must be combined in the special way shown in the picture—two H's for one O. There is another

way in which hydrogen and oxygen can combine in which there are two H's for two O's, so that each molecule of this other substance consists of four parts instead of three. But this other substance is not water; it is not even a special kind of water, but is something quite different.

Now, there is another word which we must learn here. What is the name of the tiny specks of H or of O which go together, two of the first to one of the second, in order to form a molecule of water? These tiny specks are called atoms, and so we can say now that *water is made of molecules, and each molecule contains two atoms of hydrogen and one of oxygen.*

So when we speak of an element like oxygen or gold, we simply mean something consisting of a number of atoms all of the same kind. When we speak of a compound, such as water, we mean something made of molecules which themselves are made up of atoms of at least two kinds; and when we speak of a mixture, we simply mean that two or more kinds of atoms, such as oxygen and nitrogen, have got mixed up together.



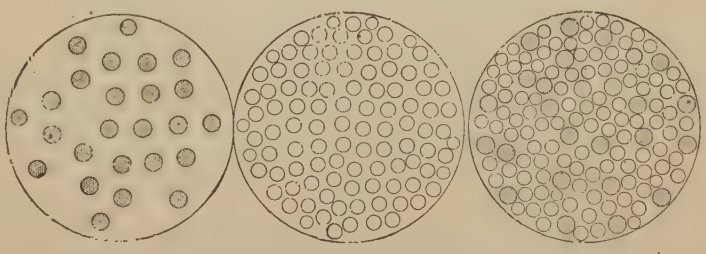
The tiniest part of water is made up of three parts like the top picture, called a molecule; the large picture shows how these together form a drop of water.

Now, atoms are most important things, for it is their properties that give the elements their properties. Gold is gold because it is made of atoms of gold; and oxygen is oxygen because it is made of atoms of oxygen. And, just as we saw that all the molecules of water are the same everywhere, and that all water everywhere is made of the same kind of molecules, so also we must know that all the atoms of any particular element are the same. There are atoms of oxygen in this page before you, and in your eye, and in the sun, and in water, though in water they are combined with hydrogen. But all atoms of oxygen everywhere are all the same, and we can know them because they are the same.

Finally, let us remember the way in which water can be made. If we take the right proportions of oxygen and hydrogen—that is, eight times as much oxygen as hydrogen, so as to give us two hydrogen atoms for every one of oxygen—and if we let them mix in a jar, and if then we pass a spark of electricity through them, the atoms of the two gases will rush towards each other, each atom of oxygen taking two of hydrogen; and the two gases will totally disappear, leaving in place of them a tiny drop of water.

If we want to express very shortly the nature of water—that is to say, the make-up of a molecule of water—we can simply write down a big H for hydrogen and put a little 2 beside it to show that we want two hydrogen atoms; and then we can take a big O to stand for oxygen, and put a little 1 beside it to mean that we want one oxygen atom; and then we can write them together like this H_2O_1. In order to save trouble we usually drop out the 1, and so, when we want to write water in this special way, we simply say H_2O, and that represents the molecule of water, made up of two H, or hydrogen, atoms, and one O, or oxygen, atom.

About half of all the matter of the earth, so far as we can examine it—that is to say, including the crust of the earth, the sea, and the air—is made up of oxygen, and all the other elements put together make up the other half. I hope we are quite clear now about the difference between an atom and a molecule. The two words used often to be confused, but we must use them rightly.



The pictures show how atoms mix. The dark balls are like atoms of an element, such as oxygen. The light balls are like atoms of another element such as hydrogen. When the two mix, we get a *mixture* of elements, as in the third picture. The air is such a mixture. Oxygen and hydrogen make such a mixture, but that is not water, for water is a compound, not a mixture.

THE NEXT STORY OF THE EARTH BEGINS ON PAGE 1189.

THE KING WHO DEFIED THE NATION

Charles Stuart believed that kings could do no wrong, and when King of England he trampled down the rights of the nation and cared nothing for the freedom of the people. The people rose in anger against the tyranny of the king, and armed men to fight—the Parliament and the nation against the king and the nobles. This picture shows Charles raising his standard at Nottingham, where the great Civil War began.

King Charles, who had set his people at defiance, was hunted up and down the land. Oliver Cromwell, a plain country gentleman farming in Huntingdon, raised a wonderful army, which fought the king from battlefield to battlefield and beat him everywhere. At last Charles was captured and tried as a traitor in Westminster Hall, where he was condemned to death. This picture shows the king departing from his trial.

WHAT THIS STORY TELLS US

WE have come to the most stirring time in the history of England, the time of the Stuart kings. The idea that kings could do no wrong filled the minds of the Stuarts, until they ruled so harshly that it seemed as if they had forgotten Magna Charta. The old tyranny came back, and the king trampled on the rights the people had won. But the people would not let their freedom go. There came a farmer from Huntingdon who left his farm, who led the people against the king, who raised the finest army of men that has ever been known, who defeated Charles Stuart, imprisoned him, had him tried and led out to die for his sins against the people. For eleven years there was no king in England, and Oliver Cromwell ruled the Commonwealth. We read his wonderful story, and the full story of Charles I. and the men of the Civil War, in the BOOK OF MEN AND WOMEN; but here we run quickly over these eventful times in this history, until the reign of the Stuarts came to an end.

THE TIMES OF THE STUARTS

CONTINUED FROM P. 862

THE messenger who rode north at such breakneck speed to tell James Stuart that his cousin Elizabeth was dead did the journey in a few days, much to everyone's surprize. Now news is flashed between Edinburgh and London in a few seconds, and we travel the distance by rail in about eight hours!

So secure did James feel about the succession to the English crown that his journey south was a sort of pleasure excursion, taking three or four weeks. A few of his lords attended him, and they ambled along day after day, through the heart of the quiet country, in the pleasant spring weather, being entertained at fine houses on the way.

Three centuries had passed since the old Hammer of the Scots, Edward I., had so ardently desired that the north and south kingdoms should be united under one ruler—three centuries of constant war, now on one side, now on the other, of the Border. Yet the desired union of the crowns did not come about on the battlefield, but peacefully by inheritance, and by request of Parliament, when James VI. of Scotland was crowned James I. of England in the old coronation chair, over the old block of stone that the Scots had so hated to lose, within a few feet of Edward's resting-place in the Abbey. For another hundred years the two countries had their own Parliaments and governments; but under the last of the Stuarts the union became complete.

Let Sir Walter Raleigh lead us into the Stuart times, the times when England began to spread beyond her old sea boundary, for he was one of the first to understand the real use of the discoveries of Columbus and Elizabeth's sea captains. James set his heart on finding gold and treasures that could be brought over in ships. What really was needed was for English people to go over the ocean and make new homes in the New World, and found states to be governed by the same laws as at home. Then the settlers, or colonists, must cultivate their new estates and grow food, not only for themselves, but for other parts of the world. It took many years for the nations on the east of the Atlantic to realize the wonderful extent and use of the lands on the west, and nearly all the sixteenth century passed away before they seriously put in claims to share in them.

The first settlers from every country had hard times to bear, and much failure. It was Sir Walter Raleigh who named England's first colony after Queen Elizabeth, Virginia, and James gave it a charter.

By this time Spain, Portugal, Holland, France, all had dominions on each side of the Atlantic, and very soon struggles and fights about the new lands arose, which led to nearly two centuries of war amongst the five greater nations of Europe.

This spreading out of empire across the ocean led to another cause of war. When the ocean became a pathway to the New World, instead of a boundary to the old, each nation wished to be mistress of the seas, and to have the greatest number of ships upon them, manned by the most daring sailors. They wanted to protect their countrymen as they passed to and fro, whether they were bringing home rich treasures or "carrying" goods for other countries.

To-day the English have more shipping at sea than any other nation in the world; and they have spread out over the world, as colonists, more than any other people. We find the first steps towards this greatness in the days of the Stuarts.

THE BEGINNING OF THE GREAT WAR BETWEEN THE KING AND THE PEOPLE

James I. had even stronger ideas about the rights of kings than the Tudors; he believed not only that as a king he could rule and do as he liked; but that, because he was a king, he could do no wrong. This belief, which he passed on to his sons, caused great trouble in England; and freedom had once more to be fought for.

An echo from the early days of James's reign is heard every year in London streets, which is a reminder of how real and bitter was the struggle three hundred years ago. We all know the words:

"Please to remember the fifth of November, gunpowder, treason, and plot."

Year by year poor Guy Fawkes is carried round the town to be burnt in a bonfire at night. This old custom has been kept up in memory of the horror felt when he and his friends tried to blow up the king and Parliament by hidden barrels of gunpowder in the cellars under the House of Lords.

Soon after this a new plan was tried in Ireland to bring it into line with the rest of the kingdom. The owners of the land in Ulster were declared to have lost their rights to it by rebelling against England, and were driven out. English and Scotch settlers obtained these lands, and, being thrifty and industrious, they and their descendants have made the north-east corner of Ireland the most prosperous part of the country.

THE LITTLE BOAT THAT CARRIED THE PILGRIMS TO AMERICA

The settlers who landed at Jamestown, Virginia, in 1607, came to the New World to seek adventure or to better their condition in life; but others came for a different reason. Differences in religion had a good deal to do with sending people across the Atlantic, to settle in a land where they hoped to have more freedom. Those who preferred a simpler form of worship than was used in England were among the first to go, and gradually the fringe of English-speaking colonies spread along the coast of North America, to the Spanish settlements in Florida.

It was in 1620 that a little ship called the Mayflower crossed the stormy Atlantic, with about one hundred passengers on board. The long and miserable passage was no pleasure trip to the sad and earnest folk, and no warm welcome or comfortable quarters awaited them when at last they set foot on shore. But the granite boulder on which the feet of these Pilgrim Fathers, as they are called, first touched when they finally landed on American soil is still to be seen carefully railed round in front of the Pilgrim Hall in the town of Plymouth.

James himself was such a strange mixture of learning and stupidity that a brother king called him "The wisest fool in Christendom."

THE HANDSOME YOUNG PRINCE AND THE GIRL IN PICTURESQUE CLOTHES

When he died, it was his second son, Charles I., who succeeded him, for the promising, clever Henry, the friend of Raleigh, died before his father. Charles's handsome face is a very familiar one, for a famous painter, Van Dyck, lived in his reign, and painted many beautiful portraits, both of the king and his wife and their family. Very charming does Henrietta Maria look, with her girlish face framed in tiny curls, and very picturesque are her clothes. Unfortunately she was both young and foolish

*This picture shows Oliver Cromwell at the head of his famous army of Ironsides, as the men were called, on the battlefield of Dunbar, where they scattered the Royal troops. Never was such an army as this, of which Cromwell said when the war was at an end, "Truly, they were never beaten at all." "Trust in God and keep your powder dry," was Cromwell's famous advice to his Ironsides when crossing a river one day.

After the death of King Charles, Oliver Cromwell ruled in England as Protector of the Commonwealth, and England rose to a proud position among the nations. But there were many troubles during the Commonwealth, and Cromwell ruled with an iron hand. This picture shows him angrily dissolving the Long Parliament, which had sat for twelve years and had supported the nation's rights against the king.

*Copyright by Photographische Gesellschaft. By permission of the Berlin Photographic Co., New York.

when she married, and she offended people in many ways.

The group of Stuart children is very interesting, and makes a delightful picture. There is the Prince of Wales, afterwards Charles II., when a boy of seven, with his hand on a splendid big dog; the Duke of York, afterwards James II., in a dress and cap that make him look like a girl; and Mary, a little copy of her mother, in her dress and curls, who afterwards married a Dutchman, the Prince of Orange.

THE KING'S MESSENGER BATTERED IN VAIN AT THE DOORS OF PARLIAMENT

As soon as Charles began his reign, he showed that he believed even more strongly than his father that, being a king, he could do no wrong, and was thus above all law and able to rule as he chose. Englishmen had been fighting for hundreds of years to make it certain that the sovereign of the country should rule by law, and Charles's doings roused the nation into steadfast resistance.

Imagine, for instance, this scene. Charles was angry at some remarks made in the House of Commons, and sent his messenger to summon the members to his presence to be rebuked. A great patriot, Eliot, sprang to his feet, and in blazing anger defended the right of free speech in the House. As he spoke the doors were locked, and the King's Messenger battered vainly outside. The Speaker, who rules the debate, was held down in his chair—because, being a friend of the king, he wanted to get out of it—so that the speaking might stop, and all the time, amid growing tumult and noise, loud cries of "Aye, aye!" supported Eliot in his claims for English liberty. He finished with words never forgotten: "None have gone about to break Parliaments, but in the end Parliaments have broken them."

BRAVE JOHN HAMPDEN, WHO REFUSED TO PAY THE KING'S TAX

Eliot died in prison because he refused to take back his words, and Charles dissolved Parliament, and ruled without one for nearly twelve years. During this time he trampled more and more heavily on the liberties of the country, and many people joined the Mayflower emigrants across the sea.

One of the many unjust things Charles did to exasperate the people was to force money from them in ways not allowed by law. John Hampden, a country gentleman, refused to pay, and went to law with the king about it. The judges decided against him, to their deep disgrace; but the resistance of the brave man roused the nation to a still deeper sense of its danger. The growing anger of the people was like the mutterings of a storm, ever getting nearer and louder.

When at last Parliament was called together again, a great leader was found in Pym, who had the splendid gift of being able to speak so well that he could persuade men to do as he wished. The storm was getting louder. Now imagine the king bursting one day into the House of Commons in a rage, demanding that Pym and his friends should be given up to him! That caused the storm to break. The country rose and armed men to fight—the Parliament and the nation against the king and nobles.

At first Charles had the best of it. The brave Hampden was killed in one of the first battles, and for a time the Civil War raged, as in the times of the Roses, up and down all England.

THE COUNTRY GENTLEMAN WHO LEFT HIS FARM TO LEAD THE PEOPLE

There was a plain country gentleman, Oliver Cromwell, farming his rich grass meadows in Huntingdonshire, and traveling to London to sit in Parliament with Eliot and Pym, who now turned into a brilliant soldier, and raised a model army, one of the finest armies ever seen. He trained and disciplined them, and fired them with an intense desire to fight for their own religion and government. "Trust in God, and keep your powder dry," was his famous advice to them one day when crossing a river. They were able to meet the soldiers of Charles, long used to arms; and later their leader could say with pride, "Truly they never were beaten at all." These were the Ironsides.

It was they who turned the tide against Charles. He had to flee from Oxford, where he had kept up a gay Court, and at last fell into the hands of his enemies. His soldiers surrendered or fled; his possessions were captured; he was the poorest, the saddest man in the country. He was kept some time

at various castles, one being Carisbrooke Castle in the Isle of Wight, where we can still see the green where he played bowls, and the window from which he tried to escape. A little later he was taken to London.

Between Charing Cross and Westminster lies a very wide road; the statue of Charles I., on horseback, stands at the Charing Cross end of it. At the other end, close to the present Houses of Parliament, is the famous Westminster Hall, built by William Rufus. To this hall, every day for a week, Charles was taken, to be tried for taking away the liberties of the people. He was condemned to death. Halfway down the broad road is the Banqueting Hall of the Palace of Whitehall; outside one of the windows he was beheaded in the sight of his people. His dignity and charm made many people love him and pity his cruel fate.

For eleven years there was no king in England. It became a free state, in which the power of government rested with the people—a commonwealth. Both the Parliament and the Army were strong forces in these years; but the man who really ruled the country was Oliver Cromwell, now called the Protector. He was a strong and determined man, and did his best to make England great by setting things in order at home, and extending her power abroad. The great poet Milton was one of his Ministers.

THE GREAT PLAGUE THAT FELL UPON LONDON

In the terrible times of the Stuarts, after the power of the Puritans had come to an end and Charles II. came to the throne, a great plague in London carried off thousands of men, women, and children. People fell ill so suddenly and died so quickly that no one was safe, and this picture, in which a child is being removed from the stricken city, helps us to understand the sadness of life in these times.

After the death of Charles I. both Ireland and Scotland declared for his son, and Cromwell went to Ireland to put down rebellion there. So harsh and cruel were the measures he used, so terrible were the sufferings of the people, that to this day Cromwell's name is hated in Ireland, and the memories of the bitter struggle have not yet died out.

Charles's son tried to become king after his father's death, but Cromwell was too strong for him, and he was defeated at Worcester. The prince had to cut off his hair and dress in a servant's clothes to escape being taken by Cromwell's men. For six weeks Prince Charles wandered about in great danger, and had many near escapes. One day he hid himself in an oak-tree, and actually heard the soldiers talking about how soon they

would catch him as they hunted about below him. But he escaped at last to a boat, and safely crossed the Channel, to wait in France for better times to come to England.

Some of the greatest names of the Commonwealth are held in remembrance by a plain stone close to the tomb of Henry VII., in Westminster Abbey, but their bodies are no longer there. There was Cromwell himself, with his friends, Ireton, his son-in-law, and Bradshaw, who was not afraid to say these bold words when Cromwell in great anger sent away the Long Parliament: "You mistake, sir, if you think the Parliament dissolved. No power on earth can dissolve the Parliament but itself; be sure of that."

THE STUARTS WELCOMED BACK TO ENGLAND

Charles's son tried to become king after his father's death; but Cromwell was too strong for him, and he fled to France to wait for better times. After eleven years he returned, and this picture shows him landing in England. The people, forgetting what they had suffered from the Stuarts, and having been ruled by Cromwell with a strong hand, welcomed Charles, and he became king.

In the midst of a terrible storm, on the day that Cromwell considered his great day—for he had won two battles on that date—the great spirit of the Protector passed away. He was worn out in mind and body, so hard had been the task to guide the country through these troubled times.

His son Richard was a poor, feeble creature, and only ruled the country in name for a few weeks. One April, Cromwell sat on the throne of England; in May he wandered homeless, his trunk filled with congratulations from the monarchs of Europe. He came home at last to live in lodgings, and lived to be an old man.

There is a story told of a great pageant in which Queen Anne was the central figure. In the throng was an old man wearing the plain dress of a country farmer, and somebody, wondering how such a sight impressed a simple countryman, asked him, "Have you ever seen such a sight as that before?" "Never since I sat in her chair," said the old man. It was Cromwell's son, who had been all but king himself, and was then forgotten and unknown.

The name of Admiral Blake is another on the list. He was the first great seaman to have the honor of a grand funeral in Westminster Abbey. His remains now repose in the churchyard outside. The very mention of his name seems to make one feel the whistling of the wind in the sails, and the dashing of the salt sea spray. How with great skill and bravery he fought the Dutch from the Hebrides to the Channel, and how they fought him! After Spain lost its

sea power, the Dutch had held the first place, and great was the indignation of the veteran Van Tromp when Blake summoned his ship to salute the English flag. The fortune of war went up and down; now the Dutch forced Blake into the Thames, and swept the Channel, with a broom at the admiral's mast-head; now the English got the best of it in a running fight of four days.

Presently Blake appeared in the Mediterranean, and from this time English merchants had a share of the Mediterranean trade, foreign merchants beginning to trust their goods to be carried by English vessels. When the fleet in the West Indies took from Spain the island of Jamaica, England entered into a world-wide struggle, which was to lay the foundations of a world-wide empire.

Blake's last and greatest feat was his destruction of the whole Spanish fleet in the harbor of Santa Cruz, in the island of Teneriffe. Not a single ship escaped, but all were sunk or burnt. Blake worked his own fleet out in the teeth of a gale. It is recorded that this great admiral did his best to make his sailors' lives more bearable, and that he was greatly beloved by them. He died as his ship entered Plymouth Harbor after his last victory.

General Monck lies buried near the tomb of Mary Queen of Scots, the unhappy mother of James I. He was the great soldier of the Commonwealth, and, besides fighting at sea with Blake, he helped Cromwell in Ireland and Scotland. It was he who, after Cromwell's death, took the chief part in bringing back the son of Charles I. to rule over the kingdom as Charles II.

There had been many troubles during the Commonwealth; the Puritan party, to which Cromwell and his friends belonged, had been often overbearing and very disagreeable, and the people, forgetting what they had suffered from the Stuarts, hailed the change with joy, thinking all would now go well.

THE LAST STUART KING DRIVEN OUT OF THE KINGDOM

The picture opposite shows us the Stuarts coming back to England. This picture shows us the last Stuart being driven out for ever. Charles II., after a bad reign, died, and in his place James II. became king. He, too, was a bad and useless king, and at length the people would have Stuart kings no longer to reign over them. James II. was defeated on the banks of the River Boyne, in Ireland, and here we see him making his escape.

Look at the group of the children of Charles I., and compare the faces of the two boys with their faces as grown men. There are many portraits of them, and their friends and courtiers, all with flowing, curly hair, fine velvet, and embroidered clothes. The Puritans

hated their pleasure-loving ways and smart clothes, and dressed themselves plainly, and cut their hair short. One of the greatest of the Puritans, John Bunyan, spent years in prison during Charles's reign for his religious opinions. While shut up away from his wife and little blind child, he wrote what has been called the most widely-read book in the English language next to the Bible —the Pilgrim's Progress. (See page 1125.)

King Charles's sympathies were all against the Puritans. He went as far as he dared in trying to take away rights and liberties from the country, but openly said that he would do nothing that would "send him again on his travels." A very important Act was passed in this reign by which no Englishman could ever be kept in prison without a trial.

THE GREAT PLAGUE OF LONDON AND THE FIRE THAT SWEPT IT AWAY

In these times there occurred a great plague, a terrible disease which carried off thousands of men, women, and children. It was like the Black Death in the reign of Richard II., and people fell ill so suddenly, and died so quickly, that no one felt safe. It was a wonderful thing that in the year after this plague smote London there broke out the Great Fire, destroying any traces of the plague that might be left behind. The fire spread all over the centre of the city, from the Tower to the Temple Church, in 1666. The tall monument near London Bridge marks the spot where it broke out. A writer who saw it describes the stones of old St. Paul's Cathedral rattling down and the molten lead running along the streets in a stream, the very pavements glowing with fiery heat. Four hundred streets, over thirteen thousand dwelling-houses, and nearly a hundred churches were destroyed. The king and his brother did what they could to stop the progress of the flames, by blowing up houses with gunpowder, so making a gap which the fire could not cross. Dreadful as it all was, it really was best for London that its unhealthy streets should disappear.

So when the Great Fire swept away the streets in which there had been so much sickness and misery, a new and healthier city was built.

England was brought very low about the time of the plague and the fire. All that Elizabeth and Cromwell had tried to do towards making it a power in Europe seemed to be undone by Charles II. in his dealings with foreign countries. He received a great deal of money from the powerful King of France, Louis XIV., for promising to help him to secure part of the Netherlands; he even sold him the town of Dunkirk, near Calais, which Cromwell took because it commanded the Channel.

HOW MEN DRIVEN FROM OTHER LANDS FOUNDED TRADE IN ENGLAND

Can you imagine the feelings of the country about this, and also when the war was so mismanaged that the Dutch sailed up the Thames itself and burnt the ships in the Medway? After this, for a time, it was the turn of the Dutch to sail proudly up and down the Channel, "monarchs of all they surveyed." Presently it was felt that France was getting too strong, and must not be allowed to encroach so much on Holland, and at last peace was made for a while.

All through the times of the Stuarts trade was growing. We have seen how the Flemish weavers helped to establish the wool trade; and more than once religious persecution in their own country sent away numbers of industrious men with their looms to set up in England, to its great profit. French silk weavers, too, sought refuge there, and started their beautiful work, chiefly in the East End of London. We read of Queen Elizabeth being delighted with a great novelty as a present — a pair of woven silk stockings.

THE WOODEN WALLS OF ENGLAND BEGIN TO RISE

In Stuart times, frames for knitting were set up in the towns of Leicester and Nottingham, where now there are thousands of workers in the great mills. The linen and cotton trades, too, began to employ workers, though in a very small way, and most of the cotton brought from abroad was used to make candle-wicks.

In this seventeenth century coal began to be used in houses, chiefly in London, as it could easily come by water from Newcastle. People began to use it also to obtain heat for smelting iron, instead of wood. It was feared that before long all the forests would be cut down, for it took two loads of wood to make one load of charcoal, and two loads of charcoal to make one ton of iron.

Birmingham started to be a manufacturing town in that same century, ships were built on a large scale, and at the end of the century England was possessed of double the vessels that she had when the little "sea hawks" poured out of the harbors to tackle the Armada. Dockyards sprang up, such as those at Deptford and Woolwich, where the saw and the hammer were busily used in making the wooden walls of Old England.

JAMES II LOSES HIS THRONE AND HIS QUEEN ESCAPES WITH HER BABY

When Charles II. died, his sailor brother became king, as James II. He took money from the French king, as Charles II. had done, and there were many struggles and tumults, both with the people and the bishops, about the things James did contrary to law, which interfered with the rights of the people. As we look at his heavy face we can understand his want of tact, and his failure in governing his people. In a short time they could stand him no longer, and William of Orange, who had married his eldest daughter, Mary, was invited from Holland to take his place.

James's wife, Mary of Modena, fled to France with her baby boy under her cloak, under cover of night, when her husband lost his throne. When the baby grew up, his friends called him James III., but those who were against him called him the Old Pretender, because he claimed, or made pretence, to be king. Both he and his son after him, called the Young Pretender, or Bonnie Prince Charlie, made many attempts to get back the throne which James had lost, but they all failed, and the succession remained with his two elder daughters, who were Protestants.

THE POWER OF PARLIAMENT IS ESTABLISHED FOR ALL TIME

A very important Act was passed at the beginning of William and Mary's reign, to make quite clear for the future what power the sovereign of the country should possess. The old principles that we have seen fought for over and over again since the time of John came up once more—that Parliament must make and unmake laws; that Parliament must settle what taxes are to be paid; that speech in Parliament must be free.

The French helped James to make a last stand in Ireland, where William won the battle of the Boyne. For nearly ten years fighting went on with France. The Scots were against William for some time, but gave in when they saw it was useless to try to get James or his son back.

Mary's sister, Anne, became queen next. A great war broke out during the same year with France. The old king, Louis XIV., who had driven out the silk weavers, had bribed Charles II. and his brother, had helped James II. and fought William III., now wished that his grandson, the King of Spain, should also succeed to the French throne; but as this would have given too much power to one man in Europe, England, Holland, and most of the German princes united to prevent it.

"Patience will conquer all things," was the Duke of Marlborough's favorite motto, and the victories of this time for which he is famous are amongst the greatest in any history. They decided that the two crowns of France and Spain should not be united, and that the Stuart Pretender should not be helped any more. England also obtained the right of sending *one* ship a year to the South Seas. Who can count how many she sends there now?

ENGLAND AND SCOTLAND ARE UNITED AS ONE NATION

In the midst of the war, the final union of England and Scotland was completed, to the great gain of both countries. The name was henceforth Great Britain. The Scottish National Church and the old Scottish laws were left untouched; the Parliaments were united, and trade was thrown open. On the one side the English gained much from the friendship and help of the Scotch, and the Scotch had better chances to enlarge their trade and get their country into good order.

The meeting of the first British Parliament was a grand affair. Each Scottish lord was led to his place by two English lords, and Queen Anne, in her fine robes, made a speech of welcome.

The flag-makers must have been busy, for the white cross of St. Andrew on a blue ground had to be added to the red cross of St. George on a white ground. But the Union Jack was not yet complete.

THE NEXT STORY OF ENGLAND BEGINS ON PAGE 1113.

IN MARCHED A TROOP OF LITTLE MEN

An hour before daybreak the window opened and in marched a troop of little men, clothed in crimson and gold. They marched up to the dog, and said, "What will your highness be pleased that we do?"

GRANNY'S WONDERFUL CHAIR

FRANCES BROWNE was born in a village in Ireland about a hundred years ago, and she was blind. She lived a sad childhood in blindness and loneliness, but she had a wonderful mind and made up fine stories. In one of her stories is a little girl named Snowflower, with a very old grandmother called Dame Frostyface, who sat in an old armchair, and told little Snowflower the most wonderful tales. One morning Dame Frostyface went away on a long, long journey where she could not take Snowflower with her. "When you are lonely," she said to Snowflower, "lay your head down on the cushion of the armchair and say, 'Chair of my grandmother, tell me a story.'" And many a day after that little Snowflower laid her head on Granny's wonderful chair and listened to the tales it told. Frances Browne put them into a book, and these stories are from her book.

THE STORY OF CHILD CHARITY

CONTINUED FROM 980

ONCE upon a time there lived a little girl who had neither father nor mother; they both died when she was very young, and left their daughter to the care of her uncle, who was the richest farmer in all that country. He had houses and lands, flocks and herds, many servants to work about his house and fields, a wife who had brought him a great dowry, and two fair daughters.

Now, it happened that though she was their near relation, they despised the orphan girl, partly because she had no fortune, and partly because of her humble, kindly disposition. It was said that the more needy and despised any creature was, the more ready was she to befriend it; on which account the people of the West Country called her Child Charity. Her uncle would not own her for his niece, and her aunt sent her to work in the dairy, and to sleep in the back garret. All the day she scoured pails, scrubbed dishes, and washed crockery-ware; but every night she slept in the back garret as sound as a princess could sleep in her palace.

One day during the harvest season, when this rich farmer's grain had been all cut down and housed, he invited the neighbors to a harvest supper. The West-country people came in their holiday clothes, and they were making merry, when a poor old woman came to the back door, begging for broken victuals and a night's lodging. She was the poorest and ugliest old woman that ever came begging. The first who saw her was the kitchen-maid, and she ordered her off; but Child Charity came out from her seat at the foot of the lowest table, and asked the old woman to take her share of the supper, and sleep that night in her bed in the back garret. The old woman sat down without a word of thanks. Child Charity scraped the pots for her supper that night, and slept on a sack among the lumber, while the old woman rested in her warm bed; and next morning, before the little

Snowflower laid her head on Granny's wonderful chair

girl awoke, she was up and gone, without so much as saying thank you.

Next day, at supper time, who should come to the back door but the old woman, again asking for broken victuals and a night's lodging. No one would listen to her, till Child Charity rose from her seat and kindly asked her to take her supper, and sleep in her bed in the back garret. Again the old woman sat down without a word. Child Charity scraped the pots for her supper, and slept on the sack. In the morning the old woman was gone; but for six nights after, as sure as the supper was spread, there was she at the door, and the little girl regularly asked her in.

Child Charity scraped the pots for supper.

Sometimes the old woman said, "Child, why don't you make this bed softer? and why are your blankets so thin?" But she never gave her a word of thanks nor a civil good-morning. At last, on the ninth night from her first coming, her accustomed knock came to the door, and there she stood with an ugly dog.

"Good-evening, my little girl," she said, when Child Charity opened the door. "I will not have your supper and bed to-night—I am going on a long journey to see a friend; but here is a dog of mine, whom nobody in all the West Country will keep for me. He is a little cross, and not very handsome; but I leave him to your care till the shortest day in all the year."

When the old woman had said the last word she set off with such speed that Child Charity lost sight of her in a minute. The ugly dog began to fawn upon her, but he snarled at everybody else. It was with great trouble that Child Charity got leave to keep him in an old ruined cow-house. The little girl gave him part of all her meals, and when the hard frost came, took him privately to her own back garret, because the cow-house was damp and cold in the long nights. The dog lay quietly on some straw in a corner. Child Charity slept soundly, but every morning the servants said to her:

"What great light and fine talking was that in your back garret?"

"There was no light but the moon shining in through the shutterless window, and no talk that I heard," said Child Charity, and she thought they must have been dreaming. But night after night, when any of them awoke in the dark, they saw a light brighter and clearer than the Christmas fire, and heard voices like those of lords and ladies in the back garret.

At length, when the nights were longest, the little parlor-maid crept out of bed when all the rest were sleeping, and set herself to watch at the keyhole. She saw the dog lying quietly in the corner, Child Charity sleeping soundly in her bed, and the moon shining through the shutterless window; but an hour before daybreak the window opened, and in marched a troop of little men clothed in crimson and gold. They marched up with great reverence to the dog, where he lay on the straw, and the most richly clothed among them said:

"Royal prince, we have prepared the banquet hall. What will your highness please that we do next?"

"You have done well," said the dog. "Now prepare the feast, and see that all things are in the best style, for the princess and I mean to bring a stranger who never feasted in our halls before."

"Your highness's commands shall be obeyed," said the little man, making another reverence; and he and his company passed out of the window. By-and-by there came in a company of little ladies clad in rose-colored velvet, and each carrying a crystal lamp. They also walked with great reverence up to the dog, and the gayest among them said:

"Royal prince, we have prepared the tapestry. What will your highness please that we do next?"

"You have done well," said the dog. "Now prepare the robes, and let all things be in the best style, for the princess and I will bring with us a stranger who never feasted in our halls before."

"Your highness's commands shall be obeyed," said the little lady, making a low curtsey; and she and her company passed out through the window, which closed quietly behind them. The dog stretched himself out upon the straw, the little girl turned in her sleep, and the moon shone in on the back garret. The parlor-maid was much amazed, and told the story to her mistress; but her mistress called her a silly girl to have such foolish dreams, and scolded her.

Still, Child Charity's aunt thought there might be something in it worth knowing; so next night, when all the house was asleep, she crept out of bed, and watched at the back garret door. There she saw exactly what the maid had told her.

The mistress could not close her eyes any more than the maid from eagerness to tell the story. She woke up Child Charity's rich uncle before daybreak; but when he heard it he laughed at her for a foolish woman. But that night the master set himself to watch at the crevice in the door. The same thing happened again.

The master could not close his eyes any more than the maid or the mistress for thinking of this strange sight. He remembered having heard his grandfather say that somewhere near his meadows there lay a path leading to the fairies' country, and he concluded that the doings in his back garret must be fairy business, and the dog a very important person.

Accordingly, he made it his first business that morning to get ready a fine breakfast of roast mutton for the ugly dog, and carry it to him in the old cow-house; but not a morsel would the dog taste. On the contrary, he snarled at the master.

Just as the family were sitting down to supper that night, the ugly dog began to bark, and the old woman's knock was heard at the back door. Child Charity opened it, when the old woman said:

"This is the shortest day in all the year, and I am going home to hold a feast after my travels. I see you have taken good care of my dog, and now, if you will come with me to my house, he and I will do our best to entertain you. Here is our company."

As she spoke a great company, clad so grandly that they shone with gold and jewels, came in open chariots, covered with gilding and drawn by snow-white horses. The first and finest of the chariots was empty. The old woman led Child Charity to it by the hand, and the ugly dog jumped in before her. No sooner were the old woman and her dog within the chariot than a marvelous change passed over them, for the old woman turned at once to a beautiful young princess, while the ugly dog at her side became a fair young prince, with nut-brown hair and a robe of purple and silver.

There came in a company of little ladies clad in rose-colored velvet.

"We are," said they, as the chariots

drove on and the little girl sat astonished, "a prince and princess of Fairyland, and there was a wager between us whether or not there were good people still to be found in these false and greedy times. One said 'Yes,' and the other said 'No'; and I have lost," said the prince, "and must pay for the feast and presents."

Child Charity went with that noble company into a country such as she had never seen. They took her to a royal palace, where there was nothing but feasting and dancing for seven days. She had robes of pale-green velvet to wear, and slept in a chamber inlaid with ivory. When the feast was done, the prince and princess gave her such heaps of gold and jewels that she could not carry them, but they gave her a chariot to go home in, drawn by six white horses, and on the seventh night, when the farmer's family had settled in their own minds that she would never come back, and were sitting down to supper, they heard the sound of her coachman's bugle, and saw her alight with all the jewels and gold at the very back door where she had brought in the ugly old woman. The fairy chariot drove away, and never came back to that farmhouse after. But Child Charity scrubbed and scoured no more, for she became a great and rich lady.

THE GREEDY SHEPHERD

ONCE upon a time there lived in the South Country two brothers, whose business it was to keep sheep. No one lived on that plain but shepherds, who watched their sheep so carefully that no lamb was ever lost.

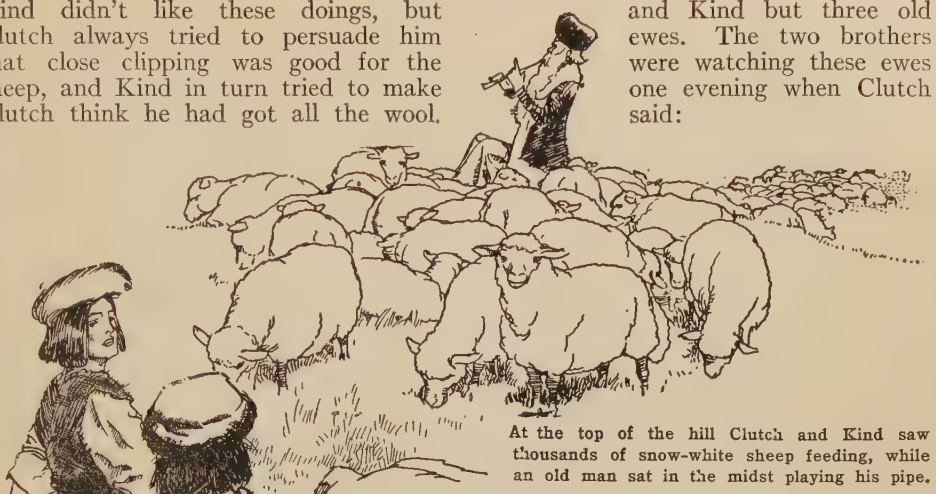
There was none among them more careful than these two brothers, one of whom was called Clutch, and the other Kind. Though brothers, no two men could be more unlike in disposition. Clutch thought of nothing but how to make some profit for himself, while Kind would have shared his last morsel with a hungry dog. This covetous mind made Clutch keep all his father's sheep when the old man was dead, because he was the eldest brother, allowing Kind nothing but the place of a servant to help him in looking after them.

For some time the brothers lived peaceably in their father's cottage, and kept their flock on the grassy plain, till new troubles arose through Clutch's covetousness.

One midsummer it so happened that the traders praised the wool of Clutch's flock more than all they found on the plain, and gave him the highest price for it. That was an unlucky thing for the sheep, for after that Clutch thought he could never get enough wool off them. At shearing time nobody clipped so close as Clutch, and, in spite of all Kind could do or say, he left the poor sheep as bare as if they had been shaven.

Clutch kept all his father's sheep when the old man died, and, when shearing, Clutch clipped so close that he left the poor sheep as bare as if they had been shaven.

Kind didn't like these doings, but Clutch always tried to persuade him that close clipping was good for the sheep, and Kind in turn tried to make Clutch think he had got all the wool.



At the top of the hill Clutch and Kind saw thousands of snow-white sheep feeding, while an old man sat in the midst playing his pipe.

Still Clutch sold the wool, and stored up his profits, and one midsummer after another passed. The shepherds began to think him a rich man, and close clipping might have become the fashion but for a strange thing which happened to his flock.

The wool had grown well that summer. He had taken two crops off the sheep, and was thinking of a third, when first the lambs, and then the ewes, began to stray away; and, search as the brothers would, none of them was ever found again. The flocks grew smaller every day, and all the brothers could find out was that the closest clipped were the first to go.

Kind grew tired of watching, and Clutch lost his sleep with vexation. The other shepherds, to whom he had boasted of his wool and his profits, were not sorry to see pride having a fall. Still the flock melted away as the months wore on, and when the spring came back nothing remained with Clutch and Kind but three old ewes. The two brothers were watching these ewes one evening when Clutch said:

"Brother, there is wool to be had on their backs."

"It is too little to keep them warm," said Kind. "The east wind still blows sometimes." But Clutch was off to the cottage for the bag and shears.

Kind was grieved to see his brother so covetous, and to divert his mind he looked up at the great hills. As he looked three creatures like sheep rushed up a cleft in one of the hills, as fast as any deer; and when Kind turned he saw his brother coming with the bag and shears, but not a single ewe was to be seen. Clutch's first question was, what had become of them; and when Kind told him what he saw, the eldest brother scolded him for not watching better.

"Now we have not a single sheep," he said, "and the other shepherds will hardly give us room among them at shearing time or harvest. If you like to come with me, we shall get service somewhere. I have heard my father say that there were great shepherds living in old times beyond the hills; let us go and see if they will take us for sheep-boys."

Accordingly, next morning Clutch took his bag and shears, Kind took his crook and pipe, and away they went over the plain and up the hills. All who saw them thought that they had lost their senses, for no shepherd had gone there for a hundred years, and nothing was to be seen but wide moorlands, full of rugged rocks, and sloping up, it seemed, to the very sky.

By noon they came to the stony cleft up which the three old ewes had raced like deer; but both were tired, and sat down to rest. As they sat there, there came a sound of music down the hills as if a thousand shepherds were playing on their pipes. Clutch and Kind had never heard such music before, and, getting up, they followed the sound up the cleft, and over a wide heath, till at sunset they came to the hill-top, where they saw a flock of thousands of snow-white sheep feeding, while an old man sat in the midst of them playing merrily on his pipe.

Clutch ran behind the old man for safety.

"Good father," said Kind, for his eldest brother hung back and was afraid, "tell us what land is this, and where we may find service; for my brother and I are shepherds, and can keep flocks from straying, though we have lost our own."

"These are the hill pastures," said the old man, "and I am the ancient shepherd. My flocks never stray, but I have employment for you. Which of you can shear best?"

"Good father," said Clutch, taking courage, "I am the closest shearer in all the plain country; you would not find enough wool to make a thread on a sheep when I have done with it."

"You are the man for my business," said the old shepherd. "When the moon rises, I shall call the flock you have to shear."

Kind clipped neatly but not too closely.

The sun went down and the moon rose, and all the snow-white sheep laid themselves down behind him. Then up the hills came a troop of shaggy wolves, with hair so long that their eyes could scarcely be seen. Clutch would have fled for fear, but the wolves stopped, and the old man said:

"Rise and shear—these sheep of mine have too much wool on them."

Clutch had never shorn wolves before, yet he went forward bravely; but the first of the wolves showed its teeth, and all the rest raised such a howl that Clutch was glad to throw down his shears and run behind the old man for safety.

"Good father," cried he, "I will shear sheep, but not wolves!"

"They must be shorn," said the old man, "or you go back to the plains, and they after you; but whichever of you can shear them shall have the whole flock."

On hearing this, Kind caught up the shears Clutch had thrown away in his fright, and went boldly up to the nearest wolf. To his great surprise, the wild creature seemed to know him, and quietly allowed itself to be shorn. Kind clipped neatly, but not too closely, and when he had done with one, another came forward, till the whole flock were shorn. Then the man said:

"You have done well; take the wool and the flock for your wages, return with them to the plain, and take this brother of yours for a boy to keep them."

Kind did not much like keeping wolves, but before he could answer they had all changed into the very sheep which had strayed away, and the hair he had cut off was now a heap of fine, soft wool.

Clutch gathered it up in his bag, and went back to the plain with his brother. They keep the sheep together till this day, but Clutch has grown less greedy, and Kind alone uses the shears.

THE FACE NO MAN COULD LOOK ON

THE MARVELOUS ADVENTURES OF PERSEUS

AN old fisherman was fishing one evening on the Greek island of Seriphos, when he saw a strange sight. A chest came floating in on the waves, and in the chest sat a beautiful lady, nursing a pretty little boy.

"Save me and help me!" cried the lady. "I am Danae, the daughter of the King of Argos, and this child is my son Perseus. My father has driven us forth like this because of an evil prophecy that Perseus should bring about his death."

The kind old fisherman took Danae and Perseus to his house, and there they stayed with him until Perseus was old enough to earn his own living. Then he became a sailor, and grew strong and hardy. At the age of fifteen he was a very remarkable lad. He stood a head taller than any man on the island, and he was the champion in every kind of warlike sport. And he had need to be, for, on returning from one of his voyages, he found that his mother was gone.

PERSEUS RESCUES THE BEAUTIFUL PRINCESS

"The King of Seriphos has fallen madly in love with her," said the old fisherman. "And, as she will not marry him, he has imprisoned her."

Perseus strode into the palace, his eyes blazing with anger, and there he discovered his mother, and set her free. For he looked so terrible that no man dared oppose him. And he was about to kill the king, when his mother said:

"Perseus, we are strangers in this place. If you harm the king all the people will attack you."

So Perseus spared the king, but the king laid a plot to get rid of the brave boy, and force the mother to become his wife. He prepared a great feast, and invited all his lords; and he also invited Perseus. Now, it was a custom on these occasions for every guest to bring the king some costly gift; but, as Perseus was a poor sailor lad, he came to the feast with nothing to give. And when the time came to present the gifts, all the lords scoffed at him. But Perseus then remembered a strange vision which he had had. Athene, the Spirit of Wisdom, had come to him in a dream, and she had told him to go forth and slay her enemy the Gorgon, and she had promised to help him. So when the lords scoffed, he cried:

"Wait, and I will bring the king such a gift as no man has ever seen. I will bring him the head of the Gorgon."

"Go, then," said the king, "and never return until you bring it."

He thought that he had sent Perseus to a certain death. For the Gorgon was a terrible woman, with a face on which no mortal could gaze without turning into stone. But Perseus went down to the cliff by the sea and waited, and Athene again appeared to him, and with her came another spirit, called Mercury. And she gave Perseus her great polished shield, and Mercury gave him his magic sandals and his enchanted sword.

"My enemy the Gorgon," said Athene, "dwells in the cold lands where the north wind blows. Go there and attack

her. But beware of looking at her face. Watch the reflection of it on my polished shield, and turn your eyes away when you strike her. Now put on the sandals, and leap off the cliff."

Perseus did so, and, instead of falling into the sea, he began to travel with great swiftness along the air on the magic sandals. On and on he went, until he came to the desolate place where the Three Grey Sisters dwelt. And the Three Grey Sisters told him to turn southwards, and go to the Garden of the Hesperides. And Perseus turned southwards, and came to the Sunset Land, where the Hesperides lived. And he saw the young and beautiful Hesperides singing and dancing in their garden around an enchanted tree laden with golden fruit. And one of these lively nymphs took pity on the brave, handsome lad, and said to him:

"The Gorgon will turn you into stone if she is able to see you. You must wear the Hat of Darkness, and then you will be invisible."

And she went down into the Underworld, and brought Perseus the Hat of Darkness; and Perseus put it on, and became invisible. He then traveled on the magic sandals to the cold land from which the north wind blows. There he held up the polished shield, and looking into it he saw the Gorgon sleeping beside her sisters on an island.

Her face was pale and beautiful, but instead of hair she had serpents growing out of her head. The serpents could not see Perseus because he wore the Hat of Darkness, and he came close up to the Gorgon, looking all the time at the reflection in the polished shield; and then, with one stroke of the sword, he cut off her head, and, still without looking at it, he wrapped it in a goatskin. Then, before the two sisters of the Gorgon could seize him, he mounted a winged horse named Pegasus, which sprang from her blood, and soared up, and traveled to the land of Iopa. Seeing a white statue standing under a black rock by the shore, he descended, and found that it was a beautiful girl chained there, and the girl cried:

"Do not set me free. I am Andromeda, the daughter of the Queen of Iopa, and I am chained here as a sacrifice. For my mother boasted that I was fairer than the Queen of the Sea, and the Queen of the Sea has sent a sea-beast to ravage Iopa. Only by offering me as a sacrifice can the land be saved."

But, when the monster appeared, Perseus unveiled the head of the Gorgon, and the monster saw it, and turned into a great, long stone. He then married Andromeda, and sailed with her to the island of Seriphos.

"Ha, you braggart castaway!" cried the king. "So you find it easier to make a promise than to fulfil it?"

Perseus showed the head of the Gorgon, and at the sight of it the king and all his scoffing lords were turned into stone. Perseus then made the kind old fisherman King of Seriphos, and led his mother to the ship, and sailed with her and his lovely wife to Argos.

And there, after killing his grandfather by accident while playing quoits, as it had been prophesied, he settled down with Andromeda and his mother, and the people made him king of the land.

THE YELLOW DWARF

THE STORY OF PRINCESS BEAUTIFUL AND THE KING OF THE GOLDEN MINES

PRINCESS BEAUTIFUL was the loveliest maiden on earth. All the great rulers in the world desired to marry her, and at last she was wooed and won by the brave young King of the Golden Mines.

But just before the wedding-day the king fell ill. No doctor was able to cure him, so the mother of the princess resolved to get a magic remedy from the Fairy of the Emerald Palace who lived by the seashore at the end of a valley that was guarded by two lions. As the lions ate up everybody who did not feed them with a certain kind of cake that they liked, the mother of the princess took some of this cake with her in a basket. On reaching the valley, she felt very tired, and fell asleep beneath a tree. But suddenly she was awakened by the roar-

THE YELLOW DWARF SITS IN THE TREE

"Ha, ha!" said someone in the tree. The mother of the princess looked up and saw a dwarf sitting amid the leaves with the cake in his hand. "Give me my cake," she cried, "or the lions will eat me up!"

ing of the lions, and, picking up her basket, she found, to her horror, that the cake was gone!

"Ha, ha!" said somebody in the tree above her head.

She looked up, and saw an ugly yellow dwarf sitting amid the leaves with the cake in his hand.

"Oh, give me my cake," she cried, "or the lions will eat me up!"

"Yes," said the Yellow Dwarf, "if you will give me your daughter in marriage."

She determined to die rather than consent to this. But when the two lions rushed upon her she was terrified, and said:

"Give me the cake, and marry my daughter!"

The Yellow Dwarf gave her the cake, and she fed the lions with it, and they let her pass unharmed. She then went through the valley to the Emerald Palace by the seashore, and obtained from the fairy the magic remedy, and with this she returned home and quickly cured the brave young King of the Golden Mines.

"Now, if I hasten on the marriage between the two lovers," she said to herself, "the Yellow Dwarf will be foiled!"

So preparations were at once made for the ceremony. Princess Beautiful and the King of the Golden Mines were as merry as singing birds in the month of May, but the mother of the princess was pale with anxiety, though she had seen or heard nothing of the Yellow Dwarf. On the way to the cathedral she kept urging the coachman to drive faster. But all her haste was useless.

"Ha, ha!" said somebody, when the wedding procession arrived at the cathedral.

The mother of the princess looked up, and saw the Yellow Dwarf sitting above the porch. Before she could utter a warning, he swooped down through the air, seized Princess Beautiful and disappeared.

The king, too, was lifted up and whirled away. When he recovered, he found himself in the Emerald Palace of the fairy, for, having come to the cathedral to help the Yellow Dwarf, she had fallen in love with the king at first sight, and carried him off.

The fairy did all that she could to win the heart of the king. She gave him the finest suite of rooms in the Emerald Palace, and held all kinds of balls and festivals there in his honor. But he used to wander sadly all day long by the seashore.

One morning a lovely woman swam up to him. As she approached he saw that she was a mermaid and had a fish's tail.

"Ah, King," she said, "you and Princess Beautiful are indeed an unhappy pair of lovers. The Yellow Dwarf has carried her to his castle on the other side of the sea, and, like you, she wanders sadly all day long by the shore."

"Can you take me to her?" cried the king.

"If you will sit on my tail," said the mermaid.

The king did so, and the mermaid swam with him across the sea to the castle of the Yellow Dwarf. Then she gave him a diamond sword, and said:

"Never let go of this sword until you have won the princess."

On arriving at the castle, the king was attacked by four unicorns. Placing his back against a great oak, he let them rush upon him and drive their long, sharp horns at him. But just as they were about to pierce him, he dropped down, and crash! went the four horns into the tree, and there the unicorns remained fixed while he killed them with the diamond sword.

At the gate of the castle he found Princess Beautiful, and threw himself at her feet. But in doing so he let go of the diamond sword, and the Yellow Dwarf, who was watching behind the gate, sprang out and picked it up, and said:

"Princess, the time has come for you to make your choice. Marry me, and I will let the king depart unharmed; or refuse to marry me, and I will slay him!"

"I will marry you!" said the princess.

In his joy the Yellow Dwarf also let go of the diamond sword, and the king snatched it up and cut off his head.

Then the lovers returned to the mother of the princess, and this time the marriage took place.

THE NEXT STORIES BEGIN ON PAGE 1077.

POETRY OF YOUTH AND MANHOOD

CONTINUED FROM 929

YOUTH is a period that lasts but a few years; a period of splendid visions. We see everything about us in the rosy light of happiness and hopefulness.

We think that all our wishes are to come true. Later, when the light in which we see things is less rosy, when all our fond wishes have not come to pass, we need not be less happy; but we shall be more wise, and realize that we wished impossible things. Yet it is only by having hope that we can do anything worth doing in this world, and youth gives us hope, which, if backed up by labor and effort, may enable us to do worthy things.

There are many poems of youth, but perhaps none so well known, and certainly none that sounds the steadfast note of high endeavor so clearly, as Longfellow's "Excelsior," given on page 715. The spirit of youth is also felt in much good poetry that makes no direct appeal to young people; and this is because so many of the great poets began to write while still in their "teens." Pope, Byron, Tennyson, and many more, wrote remarkable poems while they themselves were still youths. And as youth is also a time when the heart is care-free and generous, most of the poetry written by the poets in their earlier years is full of noble sympathy for their fellow creatures, of enthusiasm for every good cause.

It has been said that the poetry of childhood and youth may be summed up in the phrase, "When I am a Man," whereas the poetry of manhood may be summed up in the phrase, "When I was young." To some extent this is true; but it would be more correct to say that "When I was young" is the poetry of old age. For, while youth is the period of hope, manhood is the time of achievement; in old age comes reflection.

Now, we have noticed certain things about English poetry that make it remarkable, and there is a natural consequence of these. Their poets love nature and they sing the praise of childhood and youth, so it follows that they cannot but hold up a lofty ideal of manhood. There is nothing mean or ignoble in the manhood that is praised by English poets. And here the word English includes Scottish, Irish, and American. All the literature originally in the English language is English literature. But the Scottish poets sometimes use the old-fashioned Scottish tongue, as Burns does in a famous song about manhood:

> The rank is but the guinea stamp,
> The man's the gowd (gold) for a that.

Manhood, of course, includes every aspect of duty and conduct, and we shall see in due course that English poetry may inspire us to the best that manhood can achieve.

SIR GALAHAD

Alfred, Lord Tennyson, who was for many years Poet Laureate of England, wrote many wonderful poems, but none more beautiful than the "Idylls of the King," and "Sir Galahad" rings with a manly vigor tempered by a gentleness of feeling that characterizes the true knight as well as the true man.

MY good blade carves the casques of men,
My tough lance thrusteth sure,
My strength is as the strength of ten,
Because my heart is pure.
The shattering trumpet shrilleth high,
The hard brands shiver on the steel,
The splintered spear-shafts crack and fly
The horse and rider reel:
They reel, they roll in clanging lists,
And when the tide of combat stands,
Perfume and flowers fall in showers,
That lightly rain from ladies' hands.

How sweet are looks that ladies bend
On whom their favours fall!
For them I battle till the end,
To save from shame and thrall:
But all my heart is drawn above,
My knees are bowed in crypt and shrine:
I never felt the kiss of love,
Nor maiden's hand in mine.
More bounteous aspects on me beam,
The mightier transports move and thrill;
So keep I fair thro' faith and prayer
A virgin heart in work and will.

* * * * * * * *

When on my goodly charger borne
Thro' dreaming towns I go,
The cock crows ere the Christmas morn,
The streets are dumb with snow.
The tempest crackles on the leads,
And, ringing, springs from brand and mail,
But o'er the dark a glory spreads,
And gilds the driving hail.
I leave the plain, I climb the height;
No branchy thicket shelter yields;
But blessèd forms in whistling storms
Fly o'er waste fens and windy fields.

A maiden knight—to me is given
Such hope, I know not fear;
I yearn to breathe the airs of heaven
That often meet me here.
I muse on joy that will not cease,
Pure spaces clothed in living beams,
Pure lilies of eternal peace,
Whose odours haunt my dreams;
And, stricken by an angel's hand,
This mortal armour that I wear,
This weight and size, this heart and eyes,
Are touched, and turned to finest air.

The clouds are broken in the sky,
And thro' the mountain walls
A rolling organ-harmony
Swells up, and shakes and falls,
Then move the trees, the copses nod,
Wings flutter, voices hover clear;
"O just and faithful knight of God
Ride on! the prize is near."
So pass I hostel, hall, and grange;
By bridge and ford, by park and pale,
All-armed I ride, whate'er betide,
Until I find the holy Grail.

PROSPICE

In another part of this work we have given the beautiful poem "Crossing the Bar," which was Alfred, Lord Tennyson's farewell to life. Here we quote "Prospice," by Robert Browning, the noblest swan-song that has ever been written.

FEAR death?—to feel the fog in my throat,
The mist in my face,
When the snows begin, and the blasts denote
I am nearing the place,
The power of the night, the press of the storm,
The post of the foe;
Where he stands, the Arch Fear in a visible form.
Yet the strong man must go:
For the journey is done and the summit attained,
And the barriers fall,
Though a battle's to fight ere the guerdon be gained,
The reward of it all.
I was ever a fighter, so—one fight more,
The best and the last:
I would hate that death bandaged my eyes, and forbore,
And bade me creep past.
No! let me taste the whole of it, fare like my peers
The heroes of old,
Bear the brunt, in a minute pay glad life's arrears
Of pain, darkness and cold.
For sudden the worst turns the best to the brave,
The black minute's at end,
And the elements' rage, the fiend voices that rave,
Shall dwindle, shall blend,
Shall change, shall become first a peace out of pain,
Then a light, then thy breast,
O thou soul of my soul! I shall clasp thee again,
And with God be the rest!

DIRGE FOR A SOLDIER

An American, George Henry Boker, wrote this martial dirge for the soldier whose work was finished. He had done his duty, and had willingly laid down his life for his country and his flag.

CLOSE his eyes; his work is done!
What to him is friend or foeman,
Rise of moon or set of sun,
Hand of man or kiss of woman?
Lay him low, lay him low,
In the clover or the snow!
What cares he? he cannot know;
Lay him low!

Fold him in his country's stars.
Roll the drum and fire the volley!
What to him are all our wars?—
What but death bemocking folly?
Lay him low, lay him low,
In the clover or the snow!
What cares he? he cannot know;
Lay him low!

As man may, he fought his fight,
Proved his truth by his endeavour;
Let him sleep in solemn night,
Sleep for ever and for ever.
Lay him low, lay him low,
In the clover or the snow!
What cares he? he cannot know;
Lay him low!

THE END OF LIFE

We seldom have blank verse in our Book of Poetry, for reasons which were explained on page 102. The following extract is in blank verse, and is taken from a very long poem called "Festus," which had a great success in the days of our grandfathers, but is seldom read now. It was written by Philip James Bailey, who was born in 1816 and died in 1902. These lines teach us that action should be the purpose of our life.

WE live in deeds, not years; in thoughts, not breaths;
In feelings, not in figures on a dial.
We should count time by heart-throbs. He most lives
Who thinks most, feels the noblest, acts the best.
And he whose heart beats quickest, lives the longest;
Lives in one hour more than in years do some
Whose fat blood sleeps as it slips along their veins.
Life is but a means unto an end; that end,
Beginning, mean, and end to all things—God.

WISHING

We have already read several of the tuneful little poems by William Allingham. This is another by the same writer. "Wishing" is, indeed, a profitless occupation; but if we have fancy or imagination we cannot help "wishing" at times, and after all, though we have always to come back to the facts of our daily life, just as "the rover" returned for his mother's kiss, if we are wise we shall find that the things we have are usually those that for us are best worth having.

RING-TING! I wish I were a Primrose,
A bright yellow Primrose blowing in the spring!
The stooping boughs above me,
The wandering bee to love me,
The fern and moss to keep across,
And the Elm-tree for our King!

Nay—stay! I wish I were an Elm-tree,
A great lofty Elm-tree, with green leaves gay!
The wind would set them dancing,
The sun and moonshine glancing,
The Birds would house among the boughs,
And sweetly sing!

O—no! I wish I were a Robin,
A Robin or a little Wren, everywhere to go;
Through forest, field, or garden,
And ask no leave or pardon,
Till Winter comes with icy thumbs
To ruffle up our wing.

Well—tell! Where should I fly to?
Where go to sleep in the dark wood or dell?
Before a day was over,
Home comes the rover,
For Mother's kiss, sweeter this
Than any other thing!

LITTLE THINGS

The writer of these children's verses was not known as a poet, but as a compiler of books of reference for students. His name was Ebenezer Cobham Brewer, and he died in 1897 aged eight-seven. "Little Things" has long been a favorite.

LITTLE drops of water,
Little grains of sand,
Make the mighty ocean
And the pleasant land.

Thus the little minutes,
Humble though they be,
Make the mighty ages
Of eternity.

Thus our little errors
Lead the soul away
From the path of virtue,
Far in sin to stray.

Little deeds of kindness,
Little words of love,
Make our earth an Eden,
Like the heaven above.

Little seeds of mercy,
Sown by youthful hands,
Grow to bless the nations
Far in heathen lands.

THE BLIND BOY

Colley Cibber was a famous actor and writer of comedies who lived from 1671 to 1757. He was also Poet Laureate. These pathetic verses, which have been long familiar in the children's books of several generations, were written by him.

O, say, what is that thing call'd light,
Which I must ne'er enjoy;
What are the blessings of the sight?
O, tell your poor blind boy!

You talk of wondrous things you see.
You say the sun shines bright;
I feel him warm, but how can he
Or make it day or night?

My day or night myself I make
Whene'er I sleep or play;
And could I ever keep awake
With me 'twere always day.

With heavy sighs I often hear
You mourn my hapless woe;
But sure with patience I can bear
A loss I ne'er can know.

Then let not what I cannot have
My cheer of mind destroy;
Whilst thus I sing, I am a king,
Although a poor blind boy.

THE SHEPHERD'S COT

William Shenstone, the author of this artless little poem of rural life, was born in 1714 and died in 1763. He was a pleasant writer, but is not among the notable poets of England.

MY banks they are furnished with bees,
Whose murmur invites one to sleep;
My grottoes are shaded with trees,
And my hills are white over with sheep.
I seldom have met with a loss,
Such health do my fountains bestow;
My fountains all bordered with moss,
Where the harebells and violets blow.

Not a pine in the grove is there seen,
But with tendrils of woodbine is bound;
Not a beech's more beautiful green,
But a sweetbriar entwines it around.
Not my fields in the prime of the year,
More charms than my cattle unfold;
Not a brook that is limpid and clear,
But it glitters with fishes of gold.

I have found out a gift for my fair,
I have found where the wood-pigeons breed;
But let me such plunder forbear,
She will say 'twas a barbarous deed;
For he ne'er could be true, she averred,
Who would rob a poor bird of its young;
And I loved her the more when I heard
Such tenderness fall from her tongue.

THE BUTTERFLY'S BALL

William Roscoe, who died in 1831, was a writer of historical works; but he could also write lively and fanciful poetry, as we may see from this delightful piece of fancy, which is certainly among the best of all the poetry written by him.

COME, take up your hats, and away let us haste
To the Butterfly's ball and the Grasshopper's feast;
The trumpeter Gadfly has summon'd the crew,
And the revels are now only waiting for you.

On the smooth shaven grass by the side of the wood,
Beneath a broad oak that for ages has stood,
See the children of earth, and the tenants of air,
For an evening's amusement together repair.

And there came the Beetle, so blind and so black,
Who carried the Emmet, his friend, on his back;
And there was the Gnat, and the Dragon-fly too,
With all their relations, green, orange and blue.

And there came the Moth in his plumage of down,
And the Hornet in jacket of yellow and brown,
Who with him the Wasp his companion did bring,
But they promised that evening to lay by their sting.

And the sly little Dormouse crept out of his hole,
And led to the feast his blind brother the Mole;
And the Snail, with his horns peeping out from his shell
Came from a great distance—the length of an ell.

A mushroom their table, and on it was laid
A water dock leaf, which a table-cloth made;
The viands were various, to each of their taste,
And the Bee brought his honey to crown the repast.

There close on his haunches, so solemn and wise,
The Frog from a corner look'd up to the skies;
And the Squirrel, well pleased such diversion to see,
Sat cracking his nuts overhead in a tree.

Then out came the Spider, with fingers so fine,
To show his dexterity on the tight line:
From one branch to another his cobwebs he slung,
Then as quick as an arrow he darted along.

But just in the middle, oh! shocking to tell!
From his rope in an instant poor Harlequin fell;
Yet he touch'd not the ground, but with talons outspread,
Hung suspended in air at the end of a thread.

Then the Grasshopper came with a jerk and a spring,
Very long was his leg, though but short was his wing;
He took but three leaps, and was soon out of sight,
Then chirp'd his own praises the rest of the night.

With step so majestic the Snail did advance,
And promised the gazers a minuet to dance;
But they all laugh'd so loud that he pull'd in his head,
And went in his own little chamber to bed.

Then as evening gave way to the shadows of night,
The watchman, the Glow-worm, came out with his light;
Then home let us hasten while yet we can see,
For no watchman is waiting for you and for me.

THE SLAVE'S DREAM

In the old days of slavery in America, negroes were captured in Africa and taken away in ships to serve on the American plantations. No respect was paid to persons; chiefs and tribesmen, women and children, were forced into slavery. Longfellow, the American poet, here imagines one who had been a negro king and is now a worn-out slave in the south dreaming he is once more back in his native land; but his dream is the last he will ever have, for he will never wake again.

BESIDE the ungathered rice he lay,
His sickle in his hand;
His breast was bare, his matted hair
Was buried in the sand.
Again in the mist and shadow of sleep,
He saw his native land.

Wide through the landscape of his dreams
The lordly Niger flowed,
Beneath the palm-trees on the plain
Once more a king he strode;
And heard the tinkling caravans
Descend the mountain-road.

He saw once more his dark-eyed queen
Among her children stand;
They clasped his neck, they kissed his cheeks,
They held him by the hand!—
A tear burst from the sleeper's lids
And fell into the sand.

And then at furious speed he rode
Along the Niger's bank;
His bridle-reins were golden chains,
And, with a martial clank,
At each leap he could feel his scabbard of steel
Smiting his stallion's flank.

Before him like a blood-red flag,
The bright flamingoes flew;
From morn till night he followed their flight,
O'er plains where the tamarind grew,
Till he saw the roofs of Caffre huts,
And the ocean rose to view.

At night he heard the lion roar,
And the hyena scream,
And the river-horse as he crushed the reeds
Beside some hidden stream;
And it passed, like the glorious roll of drums,
Through the triumph of his dream.

The forests, with their myriad tongues,
  Shouted of liberty;
And the Blast of the Desert cried aloud,
  With a voice so wild and free,
That he started in his sleep and smiled
  At their tempestuous glee.

He did not feel the driver's whip,
  Nor the burning heat of day;
For Death had illumined the Land of Sleep,
  And his li eless body lay
A worn-out fetter, that the soul
  Had broken and thrown away!

MINNIE AND WINNIE

As we have often seen, the great poet who writes of the most serious things can also write with charm and delight about the littlest child-like fancies. This Lord Tennyson proves in these quaint little verses to Minnie and Winnie. They are as sweet and delicate as the pretty pink-lined shell itself.

MINNIE and Winnie
  Slept in a shell.
Sleep, little ladies!
  And they slept well.

Pink was the shell within,
  Silver without;
Sounds of the great sea
  Wander'd about.

Sleep, little ladies!
  Wake not soon!
Echo on echo
  Dies to the moon

Two bright stars
  Peep'd into the shell.
"What are they dreaming of?
  Who can tell?"

Started a green linnet
  Out of the croft;
Wake, little ladies,
  The sun is aloft!

GOOD-NIGHT, GOOD-NIGHT!

Joanna Baillie was one of the most popular women writers in the first half of the nineteenth century. Her poetry was read throughout the length and breadth of the English-speaking world, and several of her plays were performed with success. These beautiful lines are taken from one of her poems.

THE sun is down, and time gone by,
  The stars are twinkling in the sky,
Nor torch nor taper longer may
Eke out a blithe but stinted day;
The hours have passed with stealthy flight,
We needs must part: good-night, good-night!

* * * * * *

The lady in her curtained bed,
The herdsman in his wattled shed,
The clansman in the heathered hall,
Sweet sleep be with you, one and all!
We part in hopes of days as bright
As this gone by: good-night, good-night!

Sweet sleep be with us, one and all!
And if upon its stillness fall
The visions of a busy brain,
We'll have our pleasures o'er again,
To warm the heart, to charm the sight,
Gay dreams to all! good-night, good night!

THE LAND OF NOD*

As we are already acquainted with Robert Louis Stevenson's beautiful little poems, we might almost guess that this "Land of Nod" had been written by him, its manner is so peculiar to that charming poet. The "land" is, of course, none other than the strange country we often visit in our dreams.

FROM breakfast on through all the day
  At home among my friends I stay;
But every night I go abroad,
Afar into the land of Nod.

All by myself I have to go,
With none to tell me what to do—
All alone beside the streams,
And up the mountain-sides of dreams.

The strangest things are there for me,
Both things to eat and things to see,
And many frightening sights abroad
Till morning in the land of Nod.

Try as I like to find the way,
I never can get back by day,
Nor can remember plain and clear
The curious music that I hear.

HOHENLINDEN

One of the most famous battle poems, this was written by Thomas Campbell soon after the great battle which was fought in the year 1800. "Furious Frank and Fiery Hun" refers to the opposing forces. The French, or Franks, led by a great general, named Moreau, routed the Austrians, who for poetical purposes, may be regarded as descendants of the old Huns, the warriors that once overran most of Europe.

ON Linden, when the sun was low,
  All bloodless lay the untrodden snow;
And dark as winter was the flow
  Of Iser, rolling rapidly.

But Linden show'd another sight,
When the drum beat at dead of night,
Commanding fires of death to light
  The darkness of her scenery.

By torch and trumpet fast arrayed,
Each horseman drew his battle-blade,
And furious every charger neighed
  To join the dreadful revelry.

Then shook the hills, with thunder riven;
Then rushed the steed, to battle driven;
And, louder than the bolts of heaven,
  Far flashed the red artillery.

But redder yet that light shall glow,
On Linden's hills of stainèd snow
And bloodier yet the torrent flow
  Of Iser, rolling rapidly.

'Tis morn; but scarce yon level sun
Can pierce the war-clouds, rolling dun,
Where furious Frank and fiery Hun
  Shout in their sulphurous canopy.

The combat deepens. On, ye brave,
Who rush to glory, or the grave!
Wave, Munich, all thy banners wave!
  And charge with all thy chivalry!

Few, few shall part, where many meet!
The snow shall be their winding-sheet,
And every turf beneath their feet
  Shall be a soldier's sepulchre!

*From "Poems and Ballads" copyright, 1895, 1896, by Charles Scribner's Sons.

LITTLE VERSES FOR VERY LITTLE PEOPLE

DANCE to your daddie,
My bonnie laddie,
Dance to your daddie, my bonnie lamb!
You shall get a fishie,
On a little dishie,
You shall get a herring when
the boat comes hame!

Dance to your daddie,
My bonnie laddie,
Dance to your daddie, and to
your mammie sing!
You shall get a coatie,
And a pair of breekies,
You shall get a coatie when the boat
comes in!

GIRLS and boys come out to play,
The moon doth shine as bright as
day;
Leave your supper, and leave your
sleep,
And come with your playfellows into
the street.
Come with a whoop, come with a call,
Come with a goodwill or not at all.
Up the ladder and down the wall,
A halfpenny roll will serve us all.
You find milk, and I'll find flour,
And we'll have a pudding in half-an-
hour.

PAT-A-CAKE, pat-a-cake, baker's man!
So I will, master, as fast as I can:
Pat it and prick it and mark it with T,
Put in the oven for Tommy and me.

TAFFY was a Welshman, Taffy was a
thief,
Taffy came to my house, and stole a
piece of beef;
I went to Taffy's house, Taffy was not
at home;
Taffy came to my house, and stole a
marrow-bone;
I went to Taffy's house, Taffy was not
in;
Taffy came to my house, and stole a
silver pin;
I went to Taffy's house, Taffy was in
bed;
I took up a poker and flung it at his
head.

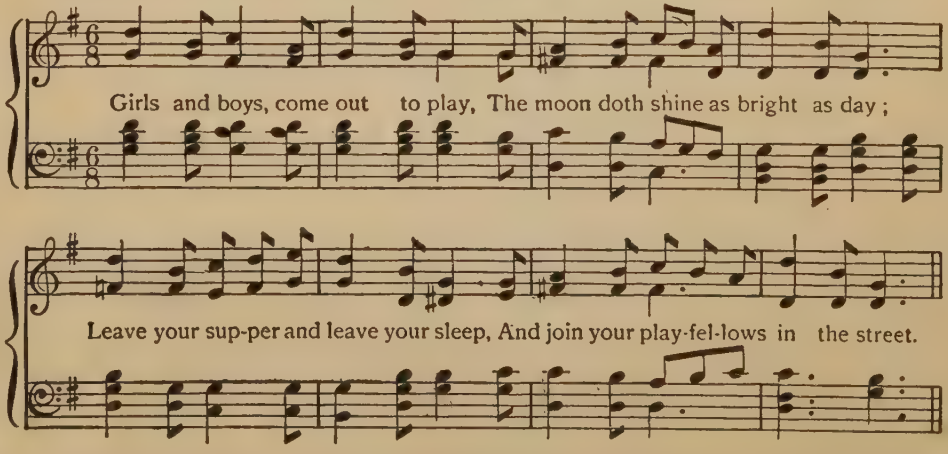
SEA-GULL, sea-gull, sit on the sand,
It's never good weather when you're
on the land.

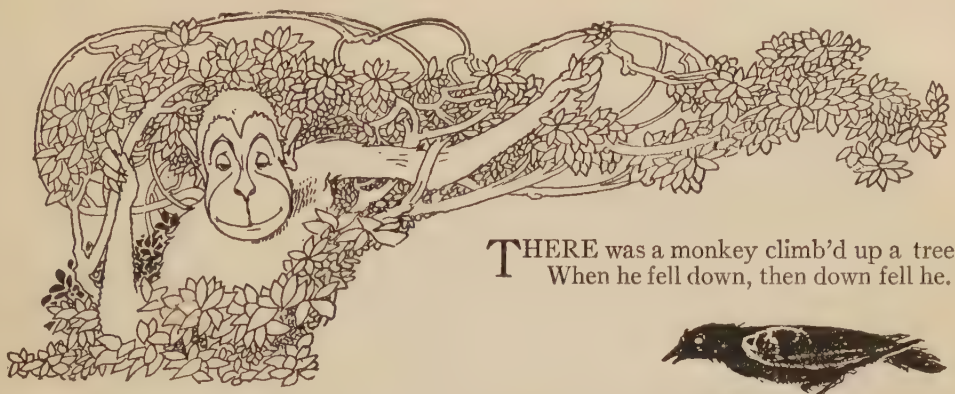
AS I walked by myself,
And talked to myself,
Myself said unto me:
Look to thyself,
Take care of thyself,
For nobody cares for thee.

I answer'd myself,
And said to myself,
In the self-same repartee,
Look to thyself,
Or not look to thyself,
The self-same thing will be.

HIGGLEDY Piggledy, here we lie,
Picked and plucked, and put in a
pie!

GIRLS AND BOYS COME OUT TO PLAY


Girls and boys, come out to play, The moon doth shine as bright as day;
Leave your sup-per and leave your sleep, And join your play-fel-lows in the street.



THERE was a monkey climb'd up a tree,
When he fell down, then down fell he.

There was a crow sat on a stone,
When he was gone, then there was none.

There was an old woman who ate an apple,
When she ate two, she ate a couple.

There was a horse going to a mill,
When he went on, he stood not still.

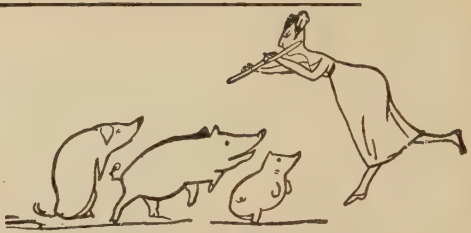
There was a butcher who cut his thumb,
When it did bleed, then blood did come.

There was a jockey ran a race,
When he ran fast, he ran apace.

There was a cobbler clouting shoon,
When they were mended, they were done.

There was a navy went into Spain,
When it return'd, it came again.

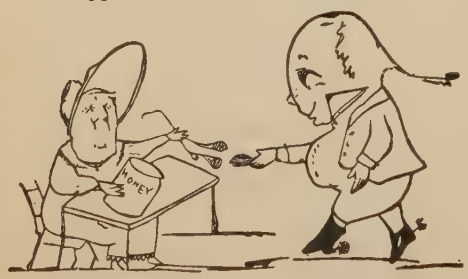
THERE was an old man who said, "Hush!
I perceive a young bird in this bush!"
When they said, "Is it small?"
He replied, "Not at all!
It is four times as big as the bush!"



THERE was a young lady of Bute,
Who played on a silver-gilt flute;
She played several jigs
To her uncle's white pigs,
That amusing young lady of Bute.

THERE was an old person of Mold,
Who shrank from sensations of cold;
So he purchased some muffs,
Some furs, and some fluffs,
And wrapped himself from the cold.

THERE was an old man of Corfu,
Who never knew what he should do;
So he rushed up and down,
Till the sun made him brown,
That bewildered old man of Corfu.



THERE was an old man of Kilkenny,
Who never had more than a penny;
He spent all that money
In onions and honey,
That wayward old man of Kilkenny.

THERE was an old man of Coblenz,
The length of whose legs was immense;
He went with one prance
From Turkey to France,
That surprising old man of Coblenz.

THERE was an old person of Sparta,
Who had twenty-five sons and one daughter;
He fed them on snails,
And weighed them in scales,
That wonderful person of Sparta.

THERE was an old person of Dutton,
Whose head was as small as a button;
So to make it look big
He purchased a wig,
And rapidly rushed about Dutton.

THE MAN WHO SAVED ST. HELIER

CONTINUED FROM 982

THE people in the Isle of Jersey were celebrating the anniversary of the Coronation of King George on June 4th, 1804. Everybody was rejoicing, and all the morning Royal salutes had been fired from the big guns in the forts. One of these was the New Fort, which stood above St. Helier, the town shown in the picture.

The guns were fired by means of long pieces of stick dipped in brimstone, and looking something like giant matches. When the saluting was over, the unused "matches" were taken back to the great magazine, where hundreds of barrels of gunpowder were stored. The firing-party then locked up the magazine, and the keys were taken away by Captain Salmon, the artillery officer.

Nothing more was thought about it till the evening, when the sentries, going their rounds, noticed smoke coming out under the door. They at once ran to give the alarm, shouting "Fire!" The signal officer, whose name was Lys, ran down from his station at the watch-house on the hill, and found that smoke was pouring from both ends of the powder magazine.

Two carpenters, named Edward and Thomas Touzel, were with the signal officer, and Thomas was asked to carry the news at once to the Commander-in-Chief, and to bring back the keys of the magazine as quickly as possible.

As he was starting, he urged his brother Edward to go with him, or at least to keep out of danger; but Edward replied: "We have all got to die some day, and I mean to save the magazine if I can."

He then called to some soldiers to lend a hand, and one of them, named Ponteney, answered: "I am ready to take the risk."

Touzel then seized a strong iron bar, wrenched open the iron railings fixed round the magazine, and after great efforts succeeded in forcing open the door of the building, from which dense clouds of smoke at once rolled. Great piles of the sulphur matches and many of the ammunition cases had caught fire, and the flames were already curling round the great barrels in which the gunpowder was stored. It seemed that every moment a tremendous explosion must take place, and everyone standing near would probably be blown to pieces.

But Edward Touzel, though he fully realized the danger, was not the man to draw back. Rushing in, he caught up great armfuls of the burning matches and threw them to Lys and Ponteney, who in their turn threw them farther away from the entrance.

Touzel did this till the skin of his face and hands was all burnt, and he was almost choked by the dense smoke. By this time soldiers were running from all directions bringing pails of water, and the fire was at last conquered.

If Touzel had waited until the keys came from the governor's house, the magazine would have blown up.

THE WOLF THAT CAME IN THE NIGHT

NEARLY a hundred years ago a French lawyer, named the Baron de Monthyon, left a large sum of money to provide an annual prize for "the poor French person who in the course of the year shall have performed the most virtuous actions."

The records of this annual award are a wonderful roll of golden deeds; but it is doubtful whether they contain a more heroic story than that of Madeleine Saunier, a poor young woman whose whole soul was fixed on doing deeds of charity, and who contrived to help others in a marvelous way.

A poor blind widow, with a feeble daughter, lived a mile and a half from her cottage, and for fifteen years Madeleine never failed to walk daily to them, to feed them, set their house in order, and cheer them up to wait for her coming the next day.

About as far off in another direction there lay in an outhouse a poor girl smitten with leprosy, and deserted by her friends. For eighteen months Madeleine visited her twice a day, to give her the little food she could take, and to dress her frightful wounds, until at last the poor leper died in her arms.

In 1840 Madeleine was nearly drowned in trying to cross a swollen stream that lay between her and one of her daily pensioners, and when she was blamed for her rashness she only said:

"I could not help it; I could not go yesterday, so I had to go to-day."

One cold winter she had a terrible experience. She was nursing a dying woman named Mancel, who lived on the hillside in a hovel more like a wild beast's den than the home of a human creature. Towards the end of a long night, Madeleine had lighted a few green sticks to try and lessen the intense cold, when the wretched door, which was only closed by a stone on the floor, was pushed aside, and she saw a wolf about to leap into the room.

She sprang to the door, and held it fast, pulling up everything she could to keep it shut, as the beast sprang against it; while she shouted as loudly as she could, in the hope that the wolf might be frightened away. But all the rest of that terrible night she had to hold the door against the wolf.

Not long afterwards the sick woman died and Madeleine feared lest the wolf should come again. So she went to the nearest cottage, and begged for shelter for the corpse until the burial. The cottagers consented, and back went Madeleine across the snow, through the lonely, wolf-haunted waste to the hut on the hillside. She took the body on her shoulders, and, bending under her burden, she brought it to the cottage, where she fell on her knees and thanked God for her safety. The next day the wolf's footsteps in the snow showed that he had been prowling round the hut during the night, and the broken-down door showed that he had found an entrance.

THE QUAKER'S STROKE

YOU must understand that Quakers are good people who believe that fighting is wicked, and therefore they refuse to become soldiers or sailors.

Well, once upon a time there was a Quaker on board an American trading vessel, when a French ship came up and gave them battle. Everyone on board the trading vessel except the Quaker fought desperately for their lives. The Quaker, with his hands clasped behind his back, walked calmly and quietly up and down the deck, in the midst of the bullets.

Then the vessels came to close quarters, and the French cried out that they would board the American ship. The Quaker continued his walk. The sides of the ships bumped and grunted together. There was a loud shout of triumph from the French. The Americans loaded their guns and stood ready to sell their lives dearly. Then a Frenchman rushed forward to lead the attack.

Just as he reached the American ship, and before anybody quite knew what had happened, the Quaker suddenly slipped up to him, put his arms about the Frenchman's body, and said very quietly and reprovingly, "Friend, thou hast no business here." And with that he lifted up the Frenchman, and, as though he were handing a baby to its nurse, dropped him gently but surely over the ship's side.

THE TALLOW DIP AND THE BLACK SALT

RATHER more than two hundred years ago, Lady Edgeworth, the beautiful young wife of Sir John Edgeworth, lived with her husband at a place in Ireland called Castle Lissard. In those days there were no trains and the roads were bad, so that little traveling was done and many people lived in the country all the year round. The men would hunt and shoot and fish, or if they were good landlords, look after their tenants, while the women of the family prided themselves upon their preserves and linen cupboards and the general comfort of the house.

There was much disturbance in Ireland at this time and very little law and order. The highways were infested with lawless men, and people who lived far from the cities often had their houses attacked, their goods stolen and they themselves were sometimes injured. This was the usual order of things, however, and people were so accustomed to it, that men and women alike were trained to act with coolness in time of need. One Christmas time, it happened that Sir John and Lady Edgeworth were entertaining guests although they knew that their house might be attacked by a party of highwaymen who were holding that part of the country in terror. In readiness for their coming a barrel of gunpowder was always kept in a loft, and the guns stacked ready for use.

One evening the alarm came. The men rapidly got their guns, and while they hurried to secure window shutters and slip heavy bolts on the doors and post sentries at various points, Lady Edgeworth went up to the loft to bring down some powder. In those days there were no cartridges, but you had to drop the powder into the barrel of the musket and ram the bullet down with a ramrod.

As she hurried up the dark old staircase she saw a stooping form in one of the corners and recognized Biddy, the new little maid-servant who had but recently arrived from the city and was frightened out of her senses by the thought of robbers.

Lady Edgeworth pretended not to notice her alarm.

"Come, Biddy," she called, "carry this light for me." And the little maid ran to her with relief and took the light, which was nothing better than a spluttering tallow candle, without a candle-stick, as was common enough at that time. Together the two women mounted the shallow stairs to the gallery which ran around the main hall, and then Lady Edgeworth opened one of the many doors which gave off from the gallery. A steep flight of wooden stairs leading up into gloom and cobwebs appeared, and a curious smell floated out upon the air. The young girl shivered and hung back, but her mistress merely laughed at her tremors, and taking the candle, led the way up to the loft.

Biddy knew nothing about gunpowder, and Lady Edgeworth did not explain what she was in search of, for she knew that it would only increase the girl's terror. Yet when she had got half-way down the stairs again she looked back and saw Biddy behind her with no candle.

"Biddy," said Lady Edgeworth, with a curious sinking feeling, though she spoke quite calmly, "where's the candle?"

"Sure, and I left it," says Biddy, "sticking in the barrel of black salt. I'll go fetch it!"

Now, even the kind of wax candle that we use, would have been dangerous enough, but the old tallow candles shed sparks much more easily. If a spark from that candle reached the "black salt," there would be a fearful explosion; half the house would be blown down and many lives lost. As quick as a flash Lady Edgeworth decided what to do. She turned and bade the wondering little maid go quickly down, and then darted upstairs again to where the candle stood spluttering and flaring on top of the barrel of gunpowder. There was not a second to lose and the brave young wife did not hesitate: she lifted the candle with firm fingers and, shading it with her hand, carried it calmly out of the room. Neither she nor anyone else got hurt, so her golden deed was by no means in vain. The heroine herself lived to be ninety years old and was the ancestress of Maria Edgeworth, whose books on Irish life and manners suggested to Sir Walter Scott his pictures of Scotland and to Turgeneff his studies of the Russian peasant.

THE NEXT GOLDEN DEEDS ARE ON PAGE 1187.

This is a sea-lion, one of the great family of seals. Seals are all born on land or on ice-floes; the mothers have to teach the young ones to swim. The poor animals are cruelly treated by hunters, who kill them for the sake of their fur, skin, oil and blubber.

The walrus shown here is a monstrous animal, 12 to 15 feet in length and very heavy, and waddles with difficulty on land. Its great tusks are used for the purpose of digging up the shell-fish on which it lives. It fights bravely to save the lives of its young ones.

The small picture shows us a common seal. The larger animal is the sea-elephant, which is larger than the land elephant. It measures from 20 to 30 feet in length and from 15 to 18 feet round. Its snout is lengthened into a sort of trunk. The body of a full-grown sea-elephant contains about 70 gallons of pure oil.

WHAT THIS STORY TELLS US

THE age of giant animals is not quite passed away. There are giants still in the sea, so big that the biggest animals on land would seem small beside them. They could not get food enough on land, so they have changed from land animals into sea animals. There, in the vast deep, great whales live their lives amid friends and terrible enemies; and whales are not the only animals which left the land for the ocean. The great waters hide many curious creatures—some of them the animals which men call mermaids. Seals of many sorts pass the greater part of their lives in the sea, but they come to land for a certain time each year. Then they go back, having first taught their babies, which are always born on land, how to swim and hunt for their food in the deep. Here we read of these monsters, and see how, by improving their brains, they live on, while others like them, but without their brain-power, perished millions of years ago.

ANIMALS LIVING IN THE SEA

CONTINUED FROM 1018

IN reading these stories about Nature's great family of animals, perhaps you may feel a little vexed to think that this is the day of small things—the day of smaller lions, and tigers, and reptiles; of smaller birds and other creatures than once lived upon the earth. Well, there still live creatures as big as any that the world has known. Not even in the old days, when many creatures were monsters in size, was there a bigger animal than the whale which swims the seas to-day.

"But whales are fishes," you will say. Nearly everybody thinks that. They think that whales and dolphins, and porpoises and manatees and dugongs, are fishes, like the shark and the fishes that we eat. Scientists also thought so many years ago. But these creatures which we have been mentioning are animals. They are mammals, which, as you know, are creatures that feed their young on milk. The whale is a mammal, like a bat or an elephant.

As whales live in the sea, you would not think that they could be drowned; but they can. They, like ourselves, have to breathe the air of the atmosphere to live. To do so they have to come to the surface of the water. You know the cry of the whalers—the men who hunt the whale. "There she blows," they cry when they see a monster rise to the surface and spout streams and vapor into the air. Well, when the whale comes up to spout, it means that he has been down under water as long as he can, and has been driven to the surface to breathe out the air which has been used up in his body, and to take in a fresh supply.

Now, as he must remain below at great depths for a long time, the whale has a specially developed system of vessels in which it stores up blood purified by the air which it has taken in. This reserve of oxygen it uses up slowly while it is below the water; and by this wonderful provision it can remain in the depths for a very long time.

Clever men were for a long time puzzled to know why the whale has a monstrous flat tail. Most fishes have tails which are upright. The whale's tail is flat. The whale would not be perfect without a flat tail. As it is so huge an animal, much strength is required to drive it through the waters, and still more to raise it from a great depth to the top of the water. Fishes have gills with which they breathe the oxygen actually in the water. Whales must breathe in the open air itself. The fishes are quite well served by their upright tails which steer them through the waters when they are swimming horizontally or flat in the water. But the whale wants suddenly to bound up from the depths of the ocean to the top of the waves. His immense flat tail, which measures about 18 feet across, is the

lever which lifts him. With two or three movements of this tail he drives himself up to the top of the sea, to breathe and blow and spout to his heart's content. This is why the shape of the whale is different from that of most fish.

A WHALE THAT WAS BURIED FOR THOUSANDS OF YEARS

Once upon a time, ages and ages ago, whales were probably like frogs, in the sense that they could live either on the land or in the water. They were, most likely, great hairy animals with four legs. Some of them were armored like the crocodile. The remains of whales of other ages are so numerous, buried in the earth in parts of America, that farmers dig up their bones and use them as fences. Eighty years ago the remains of a whale were found embedded in a cliff on the south coast of England. A storm had washed away part of the cliff, and fishermen found a bone 9 feet long sticking out of the cliff. When the remains were examined they were found to be those of a whale over 70 feet long, which had died thousands of years ago.

Not all the whales have teeth—the whalebone whales have not. But the baby whales all have teeth, showing that long ago all whales had these weapons. The main difference between whales to-day is in the matter of teeth. That difference is important, because it decides what food the whale shall eat. One sort of toothed whale, the grampus, has such good teeth that it has become a cannibal. Not content with cuttle-fish, huge jelly-fish, and seals, it eats other whales. The toothed whales include the sperm whale, the bottle-nose whale, and lesser sorts. The whale without teeth, called the baleen whale—that is, the whale which has whalebone—is the most valuable of all whales. This one gives not only oil, like the toothed whales, but whalebone, which is worth over $10,000 a ton.

A WHALE'S MOUTH IN WHICH A BOAT AND ITS CREW COULD FLOAT

Let us try to picture a baleen whale. An average large one is from 60 to 70 feet in length, and from 30 to 40 feet round the thickest part. The head is about 20 to 25 feet long. Right on top of the head are the two nostrils, placed there so that the whale can breathe the moment it comes to the surface. The nostrils can be closed and shut fast by valves, which keep the water from entering the nose and reaching the lungs. On its back the whale is of a dark color, so that, with the light shining down through the water, the back of the whale looks like the water itself. Underneath the whale is light in color.

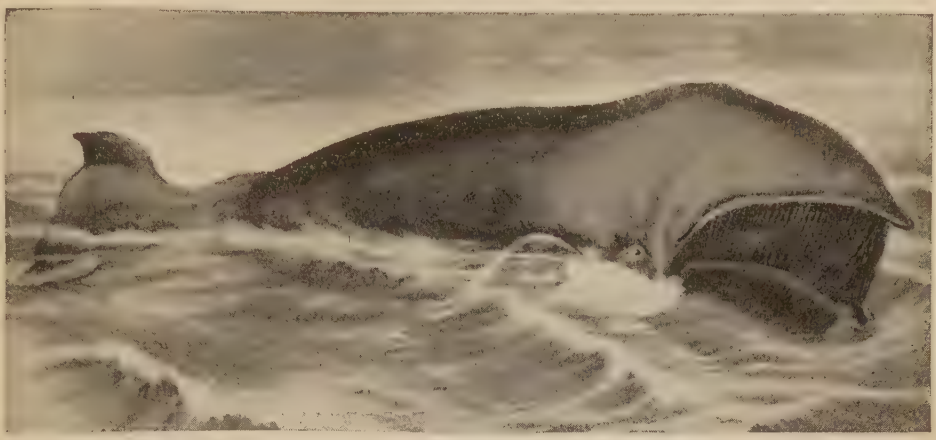
The mouth of the whale is the biggest mouth in the world. When the jaws open it looks as if the huge head had split in two. The length of the jaw is about 16 feet; it is 7 feet across, and, when open, the space between the lower jaw and the roof of the mouth is a good 12 feet. Thus a ship's boat with the crew in it could go comfortably into the open mouth of a whale. But this great cavern is more like a jungle than a cave. This whale has not a tooth in its head. The lower jaws are smooth and polished, but from the upper jaw hangs the famous baleen, or whalebone.

THE WHALEBONE IS THE WHALE'S GREAT FISHING-NET

The whalebone which you see is not cut from out the body of the whale; it is the network of plates hanging down from the roof of the mouth. A cow has hard, broad ridges on the roof of its mouth. So has the whale, only here they are greatly enlarged. The plates are thick and solid where they grow out of the roof of the mouth, but they taper away, and at the ends appear like hair. That is really what they are—plates of hair hardened into a sort of horn, fringed at the end. Of these plates there are from 200 to 400 on each side of the upper jaw, and their weight, in a big whale, is a ton and a half.

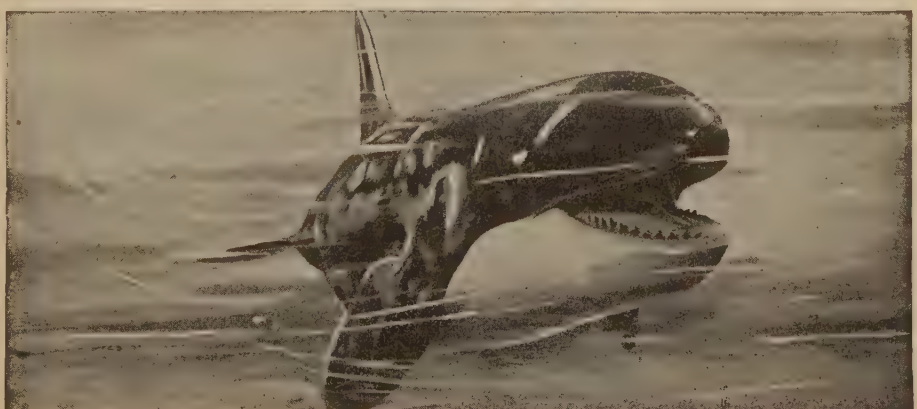
What is the purpose of this great mass of whalebone in the monster's mouth? The mouth of the baleen whale is his vast fishing-net. Although he is the biggest creature in the sea, this whale eats the smallest creatures, chiefly little jelly-fish. He has to catch these in shoals to satisfy his appetite, otherwise he would starve. So he swims into a great shoal of the things which form his food. How does he find them? He can see, and probably he can smell. When he reaches a shoal of eatable things, he charges right through it, with his mighty mouth open. The tiny jelly-

GIANT MONSTERS OF THE SEA



The biggest creatures in the world are whales. Although they live in the sea they are not fishes, but animals. They feed their young on milk; they cannot breathe under water. This is a baleen whale, which has no teeth. Its enormous mouth is fitted with whalebone, with which it catches its food, as in a fishing-net. The whalebone in a whale's mouth may weigh 1½ tons, and is worth $10,000 a ton. The whale's oil is valuable.

This is a cachalot, or sperm-whale. It has about fifty teeth in the lower jaw, but none in the upper. At the back of its head are stored tons of oil, from which we get spermaceti for ointments and the best candles. We get ambergris from the cachalot, which is made into perfume worth from $10 to $30 an ounce. The male cachalot is about 75 feet long, and fights fiercely with other cachalots when the herds are being formed.



The great whales do not eat each other, but here is a cannibal whale. It is the grampus, or killer. Several grampuses join together to kill the other whale. The grampus is 20 feet long, and has terrible teeth.

fish are taken in crowds into his mouth. The great jaws close like a drawbridge. The whalebone folds back towards the throat. In the forest of horn and hair are the fish and other things which he has caught. As the whalebone sinks back, these drop down to the whale's tongue, and the water squirts out at the sides of the mouth. Then the whale swallows his "catch."

TINY FOOD FOR THE LARGEST MOUTH IN THE WORLD

The reason for all this is that the whale must have tiny things to eat, because his throat is so small. Big men could stand upright in the mouth of the whale, but the throat of the beast is so small that it could hardly admit a man's fist; while the tube down which the food passes to the stomach is only about as thick as an ordinary walking-stick. The throat is fitted with muscles which cause it to close up like a spring trap once the food has been admitted. So much for the mouth.

But the body itself is peculiar and wonderful. Over all is the thick oily skin. It is oily so that the friction of the waves may be lessened. Underneath there is a second skin, which gives the whale its color. Still lower there is a third covering, the blubber oil and solid fat. It forms a great blanket round the whale, in places 2 feet thick. This blubber weighs quite 30 tons, as much as the weight of nearly 500 men.

HOW IT IS THAT THE WHALE IS THE FINEST OF ALL DIVERS

The oil and blubber serve a double purpose. In the first place, they keep the whale warm—for the blood of the whale, remember, is warm like ours. Next, they act as a protection against the force of the waves. Our best men divers cannot go down more than a few score feet, and the finest ships made for descending into the depths of the sea go only a comparatively little way, because the pressure of the water is so enormous. But a whale, after having taken a breath, will plunge a mile deep, and at that depth the weight which it has to bear upon its whole body is some 211,200 tons, or over 137 tons on every square foot of its body. Nothing else can bear such a pressure. Some fish which live low down in the water burst when brought to the surface of the water, because the pressure necessary to keep them whole is removed. Other fish, if forced deep down into the water, would be crushed by the weight of water which they would there have to support. But here we see that the whale, thanks largely to its blanket of springy blubber, can bear the pressure of the deep sea, and then come to the top and not be hurt when the pressure is removed.

Men hunt the baleen whale for its whalebone and blubber. The blubber makes oil. The whalebone makes a variety of things. There is nothing else so good for the purposes which it serves. The whale swims from the frozen seas of the north to the warm seas to the south of our country; so the whalebone, when removed from its mouth, will stand all sorts of climates. The best whale of this type is the Right whale, called also the Greenland whale, or the bowhead whale. One of these has been known to yield 1¾ tons of whalebone, as well as 275 huge barrels of oil.

A MAN WHO WAS NEARLY SUFFOCATED BY SINKING INTO A WHALE'S TONGUE

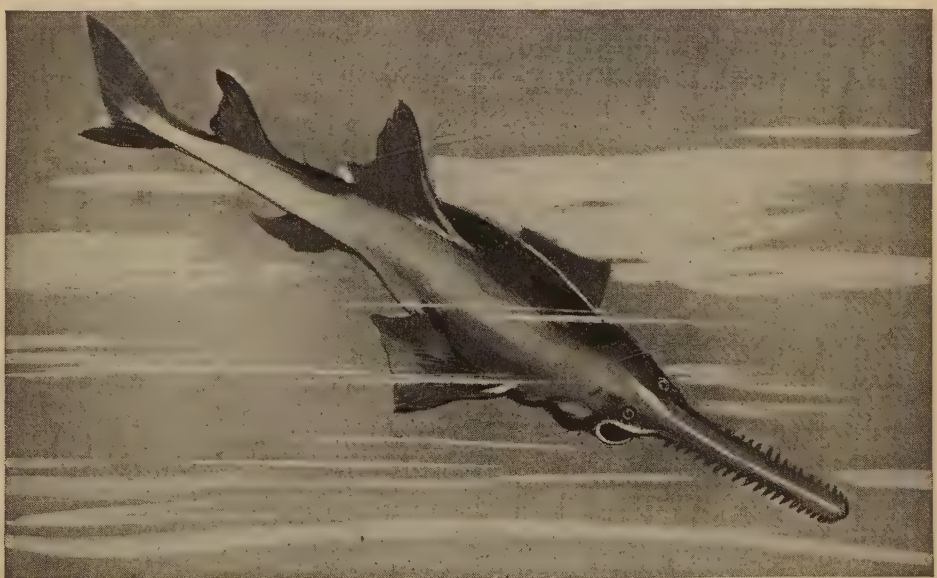
Many years ago a whale was exhibited in England, dead, of course, which was bigger than these of which we have been talking. It was 132 feet long and weighed 200 tons. Its head was 20 feet long, and 152 children stood at one time in its open jaws. Another one, shown in London, weighed 240 tons. Its head was 22 feet long, its backbone 70 feet long; its tail was 22½ feet broad and 3 feet long. Its flesh weighed 85 tons, its skeleton weighed 35 tons; and 4000 gallons of oil were extracted from the blubber. In the upper jaws were 800 plates of whalebone. The age of this whale was thought by great men to be nearly 1000 years.

Once a whale was caught in the Thames, and a man went some days afterwards to inspect it. The mouth was propped open with poles, so, wishing to see what it was like inside, the man stepped in and walked upon the whale's tongue. The weather had made the tongue soft, and the poor man sank down and down in it, until he was almost buried. Other men pushed a pole towards him, and, clinging to this, he was

Very often, when grampuses attack a big whale, the sword-fish helps them. This is a sword-fish, a fearful creature, which with its sword can penetrate the timbers of a great ship, which it mistakes for a whale.

pulled out of the whale's tongue. But for this help he would have been buried in the mass. This gives us an idea of the immense size of the whale.

Now we come to the toothed whales. Of these the largest is the cachalot. This has no teeth in the upper jaw, but those in the lower jaw number from forty to fifty, and weigh from two to four pounds each. The jaws are enormous, for the head is nearly a third of the whole length of the body, which, in the large one, measures from 70 to 80 feet. These figures describe the male whales, for the females are smaller. The cachalot is called the sperm-whale. The reason for this is the substance stored in a great chamber of the head. This chamber lies behind the nostrils, from which it is divided by a thick wall of bone, semicircular in shape and several feet high. When a sperm-whale is caught the head is cut open, and men lower buckets into the opening and take out the oil in it. This oil, when refined, gives spermaceti, from which the finest candles and many ointments are made. From one cachalot, which measured only 64 feet, there were obtained 24 barrels of spermaceti and nearly 100 barrels of oil, from which the spermaceti had been refined. Another strange product of the sperm-whale is ambergris. It is a speckled grey, fatty



This is a saw-fish, which also helps the grampus in its attacks upon the big whales. Measuring 12 feet in length, it makes a fierce rush and plunges its weapon into the soft part of its victim, then saws open a great wound, which is bound to cause death. The saw-fish has poor teeth, and can eat only soft food.

substance, into which the whale changes part of its food. Some think it a sign of disease. Ambergris used to be found floating on the sea, and men thought it was a kind of amber, and called it ambergris for that reason. But now we know that it is produced by the sperm-whale, in whose body as much as 50 pounds at a time have been discovered. Formerly ambergris was used for medicine, but now it is used only for scent. Even when it is plentiful, manufacturers pay $10 an ounce for ambergris, but when it is scarce they are glad to get it at $30 an ounce. A whale with 50 pounds of ambergris would be worth from $8000 to $25,000 for this alone, to say nothing of the value of its oil and spermaceti.

THE GREAT SEA-FIGHTS OF THE GREAT TOOTHED WHALES

The value of the whales for whalebone and ambergris, oil and spermaceti, causes them to be cruelly hunted by men, and in some seas where whales used to be plentiful hardly any are now to be found. Luckily, the seas are wide and deep, and there will always be some place to which the whales may go where men cannot find them. But they have other enemies as well as men. The sperm-whales fight fiercely among themselves. The males battle with other males, and kill each other. Great toothed whales have been found dead with their mighty jaws fast locked together. They had fought to the death, and in their closing struggles had got their jaws so tightly locked together that they could not be separated. These whales do not eat each other.

THE GREEDIEST BEAST THAT LIVES IN THE WATERS

The cannibal whale is the grampus, or "killer," as sailors call it. This is a toothed whale of a different type. It has teeth in both jaws, and is the greediest beast in the waters. One grampus has been known to swallow several entire seals one after the other. Although the grampus attains a length of over 20 feet, it would be no match for a sperm-whale in single combat, so several grampuses hunt together, like wolves. By weight of numbers, by their repeated attacks with their powerful jaws, they are able to tire out the biggest whale, and kill and eat it. They have sometimes powerful allies in the saw-fish and the sword-fish.

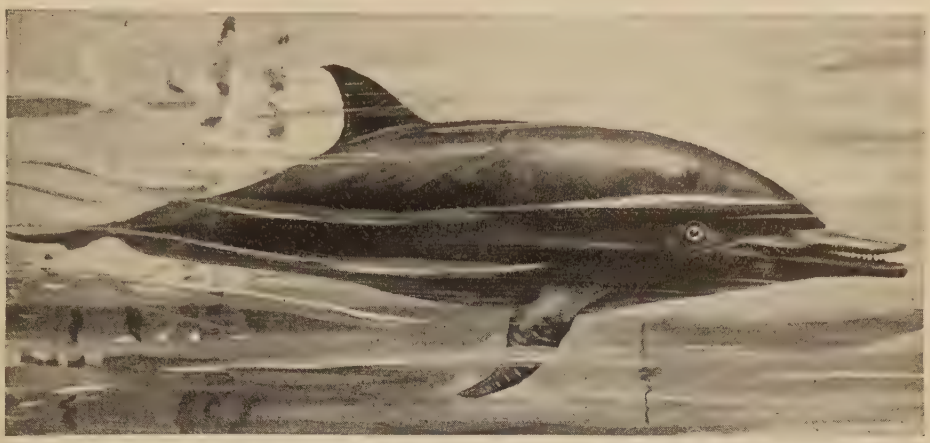
Though the names of these two creatures are similar, the fish themselves are very different. The sword-fish has a great spear growing out from its snout. The saw-fish has, in the same place, a blade of the hardest bone, from both sides of which grow out sharp saw-like teeth. The sword-fish darts with great violence upon its enemy, and stabs with its sword. The saw-fish makes the same sort of rush, but it does not stab and draw out its weapon as the sword-fish does. Instead, when it has thrust its cruel weapon into the soft part of its victim's body, it saws with it, tearing open a great wound, from which even the whale, lord of the waters, must die. Sometimes the sword-fish and the saw-fish join with grampuses in attacks upon the whale. The sword-fish reaches a length of 20 feet; the saw-fish grows to over 12 feet; so the poor whale, with such savage and active foes, has not much chance of life.

THE WONDERFUL STRENGTH A FISH CAN PUT INTO ITS SWORD

The strength of the sword-fish is almost incredible, but here are two instances to show you what it can do. One sword-fish, mistaking a ship for a whale, rushed at it, and drove its weapon right through the sheet of copper by which the hull of the vessel was covered, through a plank of oak 2½ inches thick, through a beam 7½ inches thick, and then through another plank of oak 2 inches thick. Even then it might not have stopped, but at this point the sword broke off.

Another sword-fish, attacking a whaling-vessel, drove its spear through the copper and then through 17½ inches of the hardest oak, and finally through the timber of a barrel of oil. There the weapon remained fixed so tightly that not a drop of oil escaped from the barrel. These are the natural enemies that the poor whale has to face. He himself never attacks other large creatures, and is the most harmless animal in the sea, unless enraged by enemies. In that case he is a terrible foe. With one blow of his awful tail he can shatter the side of a boat. He can send a boat flying out of the water into the air, or, with a single snap of his jaws, can bite a boat to fragments.

THREE STRANGE CREATURES OF THE DEEP



This is the merriest animal in the sea—the dolphin. It eats any kind of fish from salmon to herring, but likes shell-fish as well. Dolphins collect in shoals, and leap and tumble and gambol like happy children.

This does not look much like a mermaid of the fairy stories. It is a dugong, and men mistook it for a mermaid, because when feeding its baby it holds the little one in its arms, and the heads of the two, appearing above the waves, made sailors think that the dugong was a sort of human being.

The American manatee belongs to the same family as the dugong. The two together are called sirenia, from their fancied likeness to mermaids or sirens. The manatee goes up rivers to feed, but the dugong rarely leaves the sea. Both feed on water-plants, and the manatee helps to keep rivers free from weeds.

It is a blessing that the angry whale does not live on the land. We still find traces of his having done so. The paddles with which he swims are his hands. He used to have hands formed like ours, only larger—with four fingers and a thumb. The fingers and thumb are still there, but now they are covered over with skin and flesh to form a paddle. Deep down in his flesh we find also remnants of the bones which, ages ago, formed his hind legs and feet. His ancestor must have lived on land.

THE SEA UNICORN THAT BELONGS TO THE WHALE FAMILY

Porpoises and dolphins do not seem at first sight to resemble whales, but they are members of the toothed whale family. The most curious of the family is the narwhal, also called the sea unicorn, because it has a long horn of ivory growing out from its snout. This is not like the spear of the sword-fish. When a baby the narwhal has two little tusks in the upper jaw. These never grow any bigger in the female, but in the male the left tusk grows to a great size. The right remains small, though it increases in hardness. The left becomes a rod of spiral ivory, from 8 to 10 feet in length. With this weapon the narwhal can do great damage to fish and to boats. But it has no ordinary teeth, so it has to content itself with soft food like the cuttlefish.

A close relation to the narwhal is the white whale, or beluga, from the skin of which much of the so-called "porpoise leather" is made. It is a valuable animal to the Eskimos, who eat its flesh and use its blubber for oil, use its skin for various purposes, and feed their dogs upon what they themselves cannot eat. Thus you will see that many sea animals belong to the dolphin family.

THE BONY ARMOR THE GREAT SEA MONSTERS USED TO WEAR

One of the commonest of sea animals off the Atlantic coast is the porpoise—a handsome, graceful animal, of which the largest are 5 feet in length. It has over a hundred teeth, and its jaws lock together perfectly, so that once it seizes a salmon, a herring, or a mackerel, there is little chance of the victim escaping. The porpoise has a tiny ear, and there remains a spot near it which shows that once it had an outer ear, like the eared seal. An interesting discovery about the porpoise is that it has on its back fin a number of horny knobs.

These are the last remnants of the bony armor in which sea monsters were clothed after they had ceased to wear a covering of hair. Porpoises are magnificent swimmers, and no fish can escape them. In the tanks of many aquariums near the sea you may sometimes see one alive. They live in fresh sea-water, and are fed on herrings. They swim to and fro in the water as fast as a dog could run, and at the end of the tank they turn as smoothly and quickly as a bird in the air. They remain a long time under water without breathing.

The dolphins are a little longer than the porpoises. They are different, too, about the head. The head of the porpoise is short. The dolphin has a beak like that of a great bird, but in it are more teeth than any other animal has —over 120. Its food is like that of the porpoise, but it likes shell-fish as well as fast-swimming fish.

THE MERRIEST ANIMAL IN THE SEA, WITH OVER A HUNDRED TEETH

The dolphin is the merriest animal in the sea. It assembles in herds of twenty or more, and leaps and tumbles and gambols in the waves as merrily as squirrels in the trees. Dolphins will follow ships for hundreds of miles, and there has never been a ship yet which the swift dolphin could not outpace. The porpoise has a voice, and cries loudly if in distress. So has the dolphin, but it uses its voice for calling to its companions. It is like the distant lowing of a cow.

It is not the lowing of dolphins which makes men believe that they hear and see mermaids at sea, neither is it the sight of dolphins which deceives them. The so-called mermaids are two sea animals called the manatee and the dugong. Together they form one family, which are called sirenia, a name given them from their fancied resemblance, in the face, to mermaids or sirens. To an ordinary person they look like a kind of porpoise. But they do not eat fish. They live on seaweed and water-plants. The Malayan dugong always lives in shallow sea, but the manatees go up the rivers and eat the plants growing in their beds.

Both these animals have round, black heads. When feeding their young they hold them between their arms, or flippers, so that the head of the mother and baby are above the water. Sailors have seen them, and thought that they were mermaids. For thousands of years it has been believed that there are mermaids and mermen, human creatures with tails of fishes. Both these creatures are now rare. The manatee used to be very common in Florida, and all around the Gulf of Mexico; but now a few, carefully protected, in Florida and in Yucatan alone remain; another species abounds in Brazil, however.

THE SEAL FAMILY, AND ITS VARIED USEFULNESS TO MANKIND

The seals are a large group of active, furry, warm-blooded animals, which live in the seas and along its shores. They belong to the great tribe of carnivora, or flesh-eaters; and when you come to examine their teeth and other internal parts, you see that they are near relatives of the bears and dogs which, ages ago, took to a sea-faring life.

There are two divisions among the seals—first, the seals proper, and second, the sea-bears. They differ in many ways, but at present it is enough to say that the hind legs of the true seals are stretched straight behind them, and almost grown together, so that they are useful only in swimming, after the manner of a fish's tail, and there are no outside ears; while in the sea-bears the hinder limbs are separate and movable, enabling these animals to scramble about on land rapidly, and ears are plainly visible. The fur-bears are found chiefly in the North Pacific, though a few live in the southern hemisphere, but the true seals occur in all parts of the ocean. They are most numerous in Arctic and North Atlantic oceans. The best known is the small brown harbor seal, or phoca, which anciently was common all along the coasts of Scandinavia, France, and Great Britain; and similar kinds inhabit the Mediterranean Sea, and even those great interior salt lakes, the Caspian and Baikal, showing that formerly these were connected with the ocean. The harbor seal even now shows itself occasionally on the American coast as far south as New Jersey, but it has been killed off so much that it is now uncommon south of Newfoundland.

This is only one of several kinds which visit or live in the Arctic regions, and are the principal dependence of the Eskimo people dwelling in Labrador, Greenland, and along the Arctic coasts and islands, for clothing, food, dog-food, light, and winter fuel. In summer the seals swim as far north as the ice will let them, coming into the bays and shallows near shore to catch the fish which are spawning there. This is the hunting-season of the Polar bears and of the Eskimo, the latter shooting, spearing, and trapping the seals in great numbers, using the skins of some kinds for tents and bedding and harness, of others for outer clothing, and of others for inner clothing; and storing the flesh and oil of all, to be eaten next winter or burned in the stone lamps which alone furnish light and warmth in the cabins.

The freezing cold of winter forces most of them a little way south; and in spring, when the ice begins to break and drift out of the bays in great fields or "floes," the seals in thousands float southward with it. On these vast ice-rafts their young are born. Fleets of vessels go from Newfoundland to meet them; and when a floe is encountered, the sailors land and kill the seals, young and old, with guns and clubs, and take away whole shiploads to make their skins into leather, and to extract the oil from the little bodies.

THE HUGE ELEPHANT THAT PARADES THE WATERS

The largest and strongest of the Arctic seals is the hooded, or bladder-nose; and a near relative of it is the Antarctic sea-elephant. This is a giant, and doubly deserves its name. It measures, when fully grown, from twenty to thirty feet in length, and from fifteen to eighteen feet round. Thus it is actually bigger than our land elephant. It has a long snout, like the trunk of an elephant. When on land it can only make its way about slowly and awkwardly, hitching along on its fore-flippers like a man whose legs were strapped tightly together. It has, therefore, been so easily killed that the race is now extinct, save, perhaps, a few about Cape Horn.

THE ANIMAL THAT FIRST WORE OUR SEAL-SKIN COATS AND CAPS

The eared seals consists of the sea-lions, which dwell on the rocky ledges off the western coast of the United States, and are to be seen in every menagerie; and the fur-bears whose skins are taken to make our seal-skin jackets. The skins of other seals are hairy, and good for many purposes; but no species except this one has that fine underfur which is so warm and beautiful, after the furrier has made the skin into soft leather, pulled out the long, coarse, overlying hairs, and dyed its dingy yellow into a shining black.

These seals are seldom found except in the North Pacific. Most of the year they swim in companies in the open ocean, far from land, sleeping on the surface and feeding on fish. In the spring, however, all turn their faces northward, and travel steadily toward Bering Sea. Their purpose is to land on certain islands, far from the continents, and remain there until their young are born — one to each mother. They used to gather at these small, barren islands in millions, crawling out and climbing the hills to the interior in armies, composed of several small females, led by a great male called a "bull," for the crowd seemed like a mighty herd of buffaloes in its way of acting. The animals stayed on the islands two or three months. In August they began to leave, and as winter approached all left for the open sea, taking with them thousands of new babies which had not yet been taught to swim, as even seal-babies must learn to do.

In those early days it seemed as though no matter how many were killed at the islands by the fur-hunters, just as many returned next season as before; but by-and-by a lessening was noticed; and now, after a century of butchery, only a small herd, on a single island, remains where the multitudes used to resort. The American and other governments have tried in many ways to stop the slaughter and preserve the herd. They can guard the seals when they are on the island in the breeding season, but they cannot guard them against men who go after them in swift, sly ships from American, Canadian, Russian, Japanese, and Chinese ports, and kill them in the open sea. The result has been that seal-skin fur has become scarce and very costly.

The seals are like the camels and the whales—they can close their nostrils tightly, and keep out anything which they wish to exclude. This is necessary for them when in the water. They can remain below the surface without breathing for a long time. Another curious thing about them is that, though they get enormously fat when in the water and feeding regularly, they can go without food for three months at a time.

THE WALRUS, A SEA-GIANT WITH TUSKS OF PURE IVORY

The walrus is included among the seals, though it really is not a seal. Its body is in most respects like the body of an elephant-seal. It grows to a huge size, being from 12 to 15 feet long, and very heavy. It can walk, in an awkward, waddling way on land. Its most remarkable feature is a pair of enormous tusks which grow downward from its upper jaws, like the tusks of the extinct sabre-toothed tiger. These are of the purest ivory, and measure fully 24 inches from the point at which they emerge from the gum. Although he is such a monster, the walrus is one of the least destructive of all the sea animals. Its mighty tusks serve to grub up shell-fish, shrimps, and other little things which live at the bottom of the seas where he makes his home.

THE GREAT LOVE OF THE WALRUS FOR ITS LITTLE ONES

If he can, he will always take to the sea when attacked; but should he have to fight, he can inflict frightful injuries with his tusks.

He is hunted for his blubber and skin as well as for his bristles. The walrus and all the seals have strong bristles about their mouths. These may act as feelers, as the cat's whiskers do; but it is supposed that they serve the same part as the whalebone in dredging and screening the shell-fish which the creatures seek for food. Seals and walruses are devoted to their little ones. The male walruses will give their lives for their babies. Hunters kill the mothers and babies first, because they know that the male walrus will stay and fight to the last.

THE NEXT ANIMAL STORIES ARE ON PAGE 1209.

THE GIANT WITH THREE GOLDEN HAIRS

CONTINUED FROM 1054

THERE was once a poor man who had an only son born to him. The child was supposed to be born under a lucky star; and those who told his fortune said that in his fourteenth year he would marry the King's daughter. It so happened that the King of that land, soon after the child's birth, passed through the village in disguise, and asked whether there was any news.

"Yes," said the people; "a child has just been born, who, they say, is to be a lucky one; and when he is fourteen years old he is to marry the King's daughter."

This did not please the King, so he went to the poor child's parents and asked them whether they would sell him their son.

They refused.

But the stranger begged very hard and offered a great deal of money; and as they had scarcely bread to eat, at last they consented, thinking to themselves: He is a lucky child; he can come to no harm.

The King took the child, put it into a box, and rode away; but when he came to a deep stream he threw it into the water.

The box, however, floated down the stream; some kind fairy watched over it so that no water reached the child, and at last, about two miles from the King's Capital, it stopped beside a mill. The miller soon saw it, and took a long pole and drew it towards the shore, and inside he found the pretty little boy, who looked up at him with a merry smile. Now, the miller and his wife had no children, and so they were glad to see the baby, and saying, "Heaven has sent it to us," they treated it very kindly, and brought it up with such care that everyone loved it.

About thirteen years had passed over their heads, when the King came by accident to the mill, and asked the miller if that were his son.

"No," said the miller; "I found him when a babe, in a box in the stream, some thirteen years ago."

"He is a fine fellow," said the King. "Can you spare him to carry a letter to the Queen?"

"As your Majesty pleases," answered the miller.

Now, the King had soon guessed that this was the child whom he had tried to drown; and he sent a letter by him to the Queen, saying:

"As soon as the bearer of this arrives, let him be killed and immediately buried, so that all may be over before I return."

The young man set out with this letter, but missed his way, and came in the evening to a little cottage. There was no one within except an old woman, who said:

"Why do you come here? And where are you going?"

"I am going to the Queen, to whom I was to have taken a letter; but I

have lost my way, and shall be glad if you will give me a night's shelter."

"You are very unlucky," she said, "for this is a robber's hut; and if the band returns while you are here it may be worse for you."

But he was so tired that he laid the letter on the table, stretched himself out upon a bench, and fell asleep.

When the robbers came home and saw him, they asked the old woman who the strange lad was.

"I have given him shelter for charity," she said. "He had a letter to carry to the Queen, and lost his way."

The robbers took up the letter, broke it open, and read the directions to murder the bearer which it contained. Then their leader tore it, and wrote a fresh one desiring the Queen, as soon as the young man arrived, to marry him to the King's daughter. Meantime they let him sleep on till morning broke, and then showed him the right way to the Queen's palace, where, as soon as she had read the letter, she had preparations made for the wedding.

After a while the King returned; and when he saw the prediction fulfilled, and that this child of fortune was married to his daughter, he was very angry, and said:

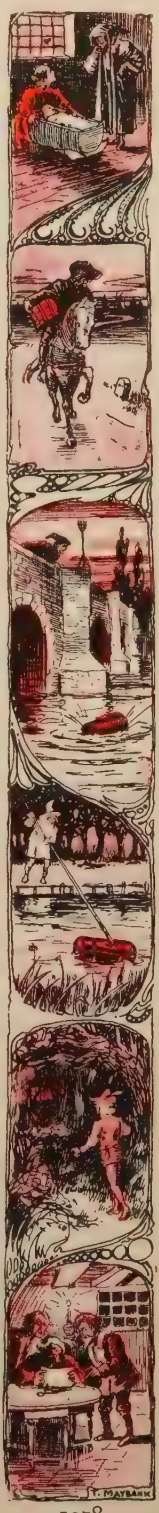
"No man shall have my daughter who does not descend into the wonderful cave and bring me three golden hairs from the head of the Giant King who reigns there."

"I will soon manage that," said the youth. And he took leave of his wife and set out on his journey.

At the first city that he came to, the guard of the gate stopped him and asked what trade he followed, and what he knew.

"I know everything," said he.

"If that be so," replied they, "you are just the man we want. Be so good as to tell us why our fountain in the market-place is dry and will give no water. Find out the cause of that, and we will give you two asses loaded with gold."



"With all my heart," said he, "when I come back."

Then he journeyed on and came to another city, and there the guard also asked him what trade he followed, and what he understood.

"I know everything," he answered.

"Then pray do us a piece of service," said they. "Tell us why a tree which used to bear us golden apples now does not even produce a leaf."

"Most willingly," answered he, "as I come back."

At last his way led him to the side of a great lake of water, over which he must pass. The ferryman soon began to ask, as the others had done, what was his trade, and what he knew.

"Everything," said he.

"Then," said the other, "pray inform me why I am bound for ever to ferry over this water, and have never been able to get my liberty. I will reward you handsomely."

"I will tell you all about it," said the young man, "as I come home."

When he had passed the water, he came to the wonderful cave. But the Giant King was not at home, and his grandmother sat at the door in her easy-chair.

"What do you seek?" she said.

"Three golden hairs from the giant's head," answered he.

"You run a great risk," said she; "yet, when he returns home, I will try what I can do for you."

Then she changed him into an ant, and told him to hide in her cloak.

"Very well," said he; "but I want also to know why the city fountain is dry, and why the tree that bore golden apples is now leafless, and what it is that binds the ferryman to his post."

"Those are three puzzling questions," said the old woman, "but

lie quiet, and listen to what the giant says when I pull the golden hairs."

Presently night set in, and the Giant King returned home. As soon as he entered he began to snuff up the air, and cried:

"All is not right here: I smell man's flesh." Then he searched all round in vain, and the old dame scolded, and said:

"Why should you turn everything topsy-turvy? I have just set all in order."

Upon this he laid his head in her lap and soon fell asleep. As soon as he began to snore, she seized one of the golden h irs and pulled it out.

"Mercy!" cried he, starting up. "What are you about?"

"I had a dream that disturbed me," said she, "and in my trouble I seized your hair. I dreamed that the fountain in the market-place of the city had become dry and would give no water: What can be the cause?"

"Ah, if they could find that out, they would be glad," said the giant. "Under a stone in the fountain sits a toad; when they kill him it will flow again."

This said, he fell asleep, and the witch pulled out another hair.

"What would you be at?" cried he, in rage.

"Don't be angry," said she, "I did it in my sleep. I dreamed that in a great kingdom there was a beautiful tree that used to bear golden apples, and now it has not even a leaf upon it: what is the reason of that?"

"Aha!" said the giant, "they would like very well to know that secret. At the root of the tree a mouse is gnawing: if they were to kill him, the tree would bear golden apples again."

Then once more he fell asleep; and when she heard him snore she pulled out the third golden hair, and the giant jumped up and threatened her, but she soothed him, and said:

"It was a strange dream. I thought I saw a ferryman who was fated to row backwards and forwards over a lake, and could never be set at liberty: what is the charm that binds him?"

"A silly fellow!" said the giant "If he were to give the rudder into the hand of any passenger, he would find himself at liberty, and the other would be obliged to take his place.'

In the morning the giant arose and went out; and the old woman gave the young man the three golden hairs, reminded him of the answers to his questions, and sent him on his way

He soon came to the ferryman, who knew him again, and asked for the answer which he had promised him.

"Ferry me over first," said he, "and then I will tell you."

When the boat arrived on the other side, he told him to give the rudder to any of his passengers, and then he might run away as soon as he pleased. The next place he came to was the city where the barren tree stood.

"Kill the mouse," said he, "that gnaws at the root, and you will have golden apples again."

They gave him a rich present, and he journeyed on to the city where the fountain had dried up, and the guard demanded his answer to their question. So he told them how to cure the mischief, and they thanked him and gave him the two asses laden with gold.

And now at last this lucky young man reached home, and his wife rejoiced greatly to see him, and to hear how well everything had gone with him. He gave the three golden hairs to the King, who could no longer raise any objection to him, and he and his beautiful wife lived happily together, and in due time became King and Queen.

The old King was well punished, for he was the very next person the ferryman saw. The ferryman gave the rudder into his hand, and to this day the old King sits, ferrying passengers across the lake.

THE NEXT STORIES BEGIN ON PAGE 1105.

THE WITCH AND THE MILLER'S SON

After many adventures the miller's son arrived at the famous cave. While the giant slept the old witch plucked the three golden hairs from his head. In the morning the giant arose and went out. Then the witch gave the young man the precious hairs which were to win for him the hand of the beautiful princess.

WHY IS THE SEA NEVER STILL?

CONTINUED FROM P. 921

THERE are times when the sea is nearly still, though no doubt even when it looks like glass there are waves in it too small for us to see. But the sea is almost always moving, though perhaps we can scarcely see it move, simply because the air above it is moving.

It is the wind that makes the waves. If there were no wind at all, the sea would slowly swell up and fall again, owing to the tides made by the moon; but it would do this very quietly, so that if you just looked for a moment you would notice nothing. But the waves, which you are thinking of when you ask this question, are made by the wind. It is true that the sea may have great waves though there is no wind, but those waves were raised by the wind somewhere else, and they have traveled to reach our eyes.

Only a short distance below the surface the sea is quite quiet; there is no such thing as waves "mountains high," and if you could see the water not so many feet down, during the greatest storm that ever was, you would find it quite still. That, of course, is simply because the waves are made by the movement of the air, and the effect of that cannot reach very far down.

WHAT MAKES THE WATER RIPPLE WHEN WE THROW A STONE INTO IT?

This is an easy question to answer if we remember one or two great facts that are true everywhere and always. In the answer to the last question we said that there may be great waves in the sea, though there is no wind, because those waves have traveled from where they were made. That is exactly what happens when you throw a stone into a stream or a pond. The wave motion, as we call it, starts where the stone falls.

Now, it is one of the great laws of Nature that when anything is at rest it stays at rest until something moves it; and when anything is started moving it will go on moving until something stops it.

If nothing stopped it, it would go on moving for ever and ever. This applies to the stone that you throw, and it applies to the wave the stone makes when it strikes the water. When a stone strikes water, or when a sound is made in the air at any point, or when a light is made, a wave motion in each case is started, which travels out from the point where it started in all directions, and will go on traveling for ever unless something stops it.

Of course, one of the things which stops it in the case of a water wave is friction, which simply means rubbing, as the parts of the water push against each other. Then it is quite natural that, as the wave gets bigger and wider, it spreads out its power over more space, and so the waves

Copyright, 1908, by Amalgamated Press, Ltd.

are not so big when they reach the bank as they were when they were started.

WHY DO WAVES BREAK ON EACH SIDE OF A CHANNEL AT THE SAME TIME?

When a wave is started anywhere in anything, in water, or air, or anything else, not only does it travel outwards from that point in all directions equally if it can, but it travels at the same rate in all directions. If three of you are out in the open air, standing at the corners of a triangle, and one speaks, the other two will hear what he says at the same time—that is to say, the wave which he has made breaks against the ears of the two listeners at the same time, because it has taken the same time to reach them. That is very much the same as the case of the wave in a channel, and the width of the channel does not matter any more than the distance you are standing apart matters in the case I have described. The same rule holds all the time.

WHAT MAKES A CURRENT IN THE SEA?

I suppose you know quite well what a current is; it is not the same thing as a *wave*, which, though it seems to move onwards, is really due to the water moving up and down. After the wave has passed, the water is in the same place as it was before. But in the case of a current—which really means something that is running—the water is actually moving from one place to another. There is a lake in Switzerland through which a river runs, and by the difference in the color of the water you can see where the river is. That is a real current. In that case it is easy to understand what makes it. The water of the river is falling to the sea, which is lower down than the place where the river started, and it is really the earth's attraction which is pulling the water of the river through the lake, so making the current.

Now, in the sea, also, currents are due to something which is pulling or pushing part of the water of the sea through the rest of the water. I am sure you see that this is quite a different thing from a wave traveling over the sea, in which case the wave travels, but the water really does not. These currents may be due to many causes; sometimes it may be a steady wind blowing for some time in one particular direction, and not only making waves, but also driving some of the water of the sea really before it. More often, perhaps, currents are due to differences in the heat of the water. Warmer water in colder water will keep to itself, so to speak, and will move through the sea. If the sun shines brightly on a particular part of the sea, then it makes the water there hotter, and so may start a current. Indeed, the currents of water in the sea are often due to very much the same causes as the currents in the air, which we call wind.

WHY DO WE COOK OUR FOOD?

There are many good reasons why we should cook certain kinds of food. Perhaps the best is that cooking makes it softer and loosens it, so as to help our teeth. This is especially true in the case of meat. Another good reason for cooking food is that the cooking kills any microbes which may be in it, and some of which might do us a great deal of harm. It is certainly much better to boil, or cook, our milk, unless we are very sure where it comes from, and a great deal of the food that we eat now, especially in cities, would certainly hurt us, by means of the microbes in it, if it were not cooked. A third reason why we cook our food is in order to make it look nice. This is especially true of meat. We have grown to dislike the look of red meat, and we prefer it cooked, so that the red colour of the blood in it is changed. There is a very great deal to say about this interesting question, but there is no room for that now, and meanwhile you must think over the three answers I have given you.

WHERE DOES THE WIND GO TO WHEN IT DOES NOT BLOW?

This question makes us begin at the very beginning in talking about the wind. The wind is a movement in the air—a current like a current in the sea, or a current you may make in your tea when you stir it, or in a basin of water if you move your finger through it. Well, if there is nothing to make a current in your tea, the tea lies still; and if there is nothing to make a current in the air—that is to say, a wind—then the air lies still, and there is no wind. So, really, the only answer to the question is that the wind goes nowhere when it does not blow; and what I mean by this is that the wind

is not a *thing* like an orange, but it is a particular *state* of the air, a state of movement, and so when the wind does not blow it is not because the wind has hidden itself away somewhere, but simply that the air is still, and that is another way of saying there is no wind.

WHERE DOES THE WIND BEGIN?

If the wind is a movement of part of the air through the air around it—and every wind is that—then we must find something which moves it; for we know that, in the case of the air, as in every other case, things which are at rest remain at rest until something moves them. The general rule about the wind is simply that it is the air moving from a place where the air is more dense or tightly packed to a place where it is rarer or less tightly packed.

People who study the weather nowadays understand how there are changes always going on in the pressure of the air at one place as compared with another; and all these changes must produce wind, since air is always moved from a place where its pressure is high to a place where the pressure is lower—somewhat in the same way as water will always try to form a level surface instead of being heaped up higher in one place than in another. If, then, we have any instrument—and the barometer is such an instrument—which tells us how the pressure of the air around us is changing, and whether it is low or high, we shall be able to guess fairly well what sort of weather we shall have, because we shall be able to guess how the wind will blow. In a slight breeze the moving air, which makes a wind, moves at such a rate as four or five miles an hour; say, a little faster than a good walker. In a gale the air will move as fast as an express train.

WHAT MAKES THE WIND WHISTLE?

The howling and whistling and all the other noises made by the wind are not heard as a rule when we are out of doors, but only when we are in a house. As the moving air forces itself through chinks of doors and windows, or perhaps even down the chimney, and so on, it sets all sorts of things that it meets vibrating or trembling, and so produces all kinds of sounds, and these are often almost musical. Often people are very much frightened by these noises, yet if they went out of doors into the wind itself they would not hear them. The wind passing through the air—that is to say, the current of air passing through the air—does not make itself known to us in sound because what our ears can hear is not a current, but a wave in the air. You cannot hear a draught.

WHAT MAKES AN ECHO?

An echo is really a very simple thing, said the Wise Man, and directly you know what sound is you can almost answer this question for yourself.

Sound is a wave in the air, and anything which will stop that wave and send it back again without altering its shape will make an echo. It is really much the same as the waves of the sea striking against a breakwater and coming back again. If the waves get broken up so that, instead of coming back as they went, they come back irregularly, then you will not hear a distinct echo, just as you will not see your face plainly in a mirror unless it is smooth. So the places where you get the best echoes are places where the sound waves are thrown back exactly as they came, just as the light waves are thrown back from a mirror. To make an echo, however, we must be standing far enough away from the wall, or whatever it is that throws the waves back, to give the ear time to hear the sound itself, and then to hear the waves as they come back.

WHAT MAKES THE ECHO WHEN WE SHOUT OUT OF DOORS?

In some large buildings an echo may be a great nuisance, for it may interfere with our hearing of a speaker or of music. In these cases it is the walls of the building which throw back the waves of sound; but very often, as this question suggests, we may hear a quite clear echo when it is not easy to say what it is that is throwing the waves back. Sometimes, also, the waves may not come back exactly as they went, but still come distinctly enough to be heard, and then people may fancy that someone else is speaking to them. I believe that many mistakes and wild notions that people have had have been due to thinking that there was some mysterious person making sounds, when really it was nothing but an echo.

Sound is a very curious thing, and we do not quite understand it yet; but we know that there are many ways in which it may be thrown back or reflected, even though there is no high wall to do so. For instance, a clump of trees will often make an echo, and it may possibly be that sound is thrown back from the air itself, perhaps because the air is really made up of different levels of air, some of which are lighter than others; and when the sound waves pass into them part of them is thrown back. We know that this happens to light also, and, indeed, it is a general rule that when a wave of any kind passes into something different from what it has just been traveling in—out of air into water, and so on—part of it is likely to be thrown back.

WHY CAN WE NOT SEE THE BOTTOM OF A RIVER?

When we were talking about echoes, we said that when a wave passes from one kind of stuff it is moving through into another, part of it is usually turned back or reflected. Now, light is a kind of wave, and it follows this rule. In passing through a window some of it is bent back, so that you can sometimes see your own face n a window; as, for instance, in the window of a railway car in a tunnel. Exactly the same thing happens when light passes from air into water; part of it is bent back, and it often happens that so much will be bent back that you will simply see the light from your own face, just as if you were looking into a mirror. But exactly what happens depends on a great many things; and if you try in these cases, and if the light is coming in the right direction, you will often be able to see not the light thrown back from the surface of the water, but the light thrown back from the bottom of the river.

COULD WE SEE TO READ BY THE LIGHT OF THE FIRE INSIDE THE EARTH?

This is rather a funny question, said the Wise Man, and I am sure you will see that it is not very easy to answer, if you remember that the deepest hole that has yet been made in the earth is only about a mile and a quarter deep; so that we are talking about what no one has ever seen. But I can answer your question this way: If we could peel off the crust of the earth, as we peel an orange, so that the glowing centre or glowing core of the earth were exposed, certainly it would be very bright indeed, something like a very tiny model of the sun; and certainly we could see to read by it. Only, of course, I do not quite know where we should be if this happened! But it is useful, and helps our minds to think that, though we live on a crust that is quite cool, yet underneath it there is a glowing core which, if it could be seen, would certainly give out a brilliant light—bright enough, I dare say, for people on the moon to read by, if there were any people there.

WHY IS INDIA HOTTER THAN ALASKA?

If you have read the answer to the last question you will see that we live "between two fires," as the saying goes. Underneath us is the fire of the earth; above us, as we say, is the great fire of the sun. Now, the differences between different parts of the surface of the earth, which make India, for instance, hotter than Alaska, have nothing to do with the fire that is underneath us. The whole difference is due to the way in which the heat of the sun strikes the earth in Alaska as compared with India.

The sun's light and heat have to pass through the air before they reach us, and the air takes up a great deal of both light and heat as they pass through it. In parts of the earth, then, where the sun's rays pass straight through the air, it is very hot and the sun is very bright.

In such parts of the world the sun seems to rise right up into the top of the sky, and the people are protected only by just the bare thickness of the air. But in other parts of the world the sun's rays have to pass through the air in a slanting direction, so that they really have a very much longer journey through the air than if they came straight down through it; and so the sun seems much less bright, and its heat is far less intense.

WHY IS FIRE HOT?

When anything is burning to make a fire, there is given out from it a par-

ticular something which we call heat. This heat is very like light, though we cannot see it. Like light, it is a wave motion in the ether, and in itself is not hot nor cold, but is nothing more or less than what I have said—a wave motion in the ether, made up of waves or rays. As it is made of rays it is often called radiant heat. This radiant heat comes to us, of course, in great quantities from the sun.

So, when you ask me why is fire hot, there are really two parts to that question. I have tried to answer the first part, but the second part is this: Why does radiant heat make us feel hot? The only answer to that is that our sense of heat is a feeling, just like seeing and hearing. So heat makes us feel hot just as light makes us see, and sound makes us hear. To put it in another way; our bodies are so made that they feel these various things outside them in these various ways.

WHY IS A SPARK MADE WHEN STEEL IS KNOCKED BY A HARD STONE?

Remember that nothing in the world is ever *lost*, but only *changed*. When you strike steel with a hard stone, the movement of the stone is not lost, it is not made into nothing; but, just in so far as it disappears, it is changed into something else.

No power goes out of the world—though it may be wasted. So we may say that the movement of a stone—which comes from the movement of your arm, which comes from the power in your food, which was made by the light of the sun—is changed into heat and light, and this shows itself in a little bit of the stone which is chipped off, and which shows its light for a moment as it jumps and falls; and that is what we call a spark. You know, of course, that long ago, before matches were invented, it was in some such kind of way as this that men had to make fire, as the pictures appearing on page 810 of this book show us.

Of course they had to have something ready which very easily took light when sparks fell upon it. You can even get a spark by rubbing two dry sticks together; but when I say *you* can, I do not advise you to try in a damp country, for you would be disappointed. You must go somewhere where there is no water at all in the air. What we would call a dry stick in this country would be a wet one in England, for the air in that country is very watery, and water takes heat away so quickly into itself that it always interferes with fire.

WHAT MAKES HEAT TRAVEL ALONG AN IRON BAR?

There are many ways, said the Wise Man, in which heat travels from one place to another. One way is by rays, and is called *radiation*. You remember that, because we were talking about radiant heat a little while ago. Then, again, heat can move about simply because a hot thing moves about and takes its heat with it. That happens in a kettle when it is boiled. The hot water at the bottom runs up to the top, and takes its heat with it. This is a case of carrying the heat, is it not? And so, when heat moves in this way, the proper name for it is *convection*. If you think that a very difficult word, all I can say is that it is just the same as the word "conveying," and if you know what to "convey" means, you know exactly this way in which heat travels.

Now, you will say this is all very well, but when heat runs along an iron bar it is not a case of radiation, nor is it a case of conveying or convection, for certainly parts of the bar do not run through it carrying the heat with them. And you are quite right. If you read the next answer, you will find what you want.

WHY DOES NOT HEAT RUN ALONG A STICK?

A poker is an iron bar, and we know that heat runs along it; yet a stick of firewood, though it is very short, may be burning at one end, and you can hold the other end in your hand without finding it hot at all. The heat does not run along the stick.

Now, in the case of the poker, the heat travels along through the little parts that make the poker, not because they move, but because each of them hands it on to the next. The proper word for this is conduction, and you see that it is quite different from convection or conveying. It is as if the atoms of the poker were a sort of stepping-stones, and the heat walked from one to the other.

Now, the poker is so made that the atoms of it are good stepping-stones for heat; indeed, iron, like all metals, lets heat run through it very quickly.

The proper way of saying this is that all metals are good conductors of heat. But the wood is made differently. It is as if the stepping-stones were too far apart, so that the heat cannot pass across them. So we say that wood is a bad conductor of heat. Everything that is good to use in making clothes is a bad conductor of heat, but I think you knew that already.

WHY DOES COLD WATER CRACK A HOT GLASS?

The reason why cold water cracks a hot glass is exactly the reason why hot water cracks a cold glass. But this does not always happen. If you use a very thin glass it will not crack either by cold water or hot water. The chemist very often uses little tubes made of very thin glass, which he calls test-tubes; and you can put these in a flame and boil water in them, without their cracking.

You might think that the thinner the glass the more readily it would crack, but really it is just the other way about. When you fill an ordinary tumbler with hot water, the heat is conducted from the water to the glass, and the glass expands or swells, but the heat has not yet reached the outside part of the glass, which stays as it was. And, so as the inner layer of the glass, which has been made hot, swells, it cracks the cold outside. Just the opposite happens when a hot glass is filled with cold water; the inside shrinks before the outside does, and so breaks it. But if you use very thin glass the heat gets through it so quickly, whether going into it or coming out of it, that it all swells or shrinks together and does not crack.

CAN WE FALL OFF THE EARTH?

We cannot fall off the earth because the earth holds us to itself by means of its attraction. The earth is so big that its power of attraction is great, and if we wished to escape it altogether we should have to use some other power sufficiently great to succeed in opposing the pull of the earth. Thus, though we cannot fall off the earth, we can imagine that we might be shot off the earth if there were some gun strong enough, but it would have to be thousands of times stronger than the biggest gun ever made. If there were no air it would be easier to shoot something up into the sky so hard that the earth would not be able to pull it back again. But, as it is, the air keeps everything back that is thrown or shot up into it. You could not throw a tennis-ball very far in water; and that suggests the kind of way in which the air would push a cannon-ball back if we tried to shoot it away from the earth altogether. Have you read the famous book of Jules Verne, which tells how some men were shot in a cannon-ball from the earth to the moon?

WHERE SHOULD WE GO TO IF WE FELL OFF THE EARTH?

The best way to imagine how we could fall off the earth would be to suppose that somehow or other the earth's power of attraction stopped altogether. If that happened, and you jumped indoors, your head would hit the ceiling. If out of doors you would go straight up into the sky for a long way, but the resistance of the air would make you move slower and slower until at last you came to a stop. There you would stay, and very cold you would find it. But suppose that not only the earth stopped pulling, but also that the air stopped resisting you. Then, if you jumped—the least little jump would do—you would sail away off into space.

That is the only way in which you could "fall off the earth." If you jumped at the right moment, as the cannon was shot at the right moment in Jules Verne's story, then you might travel towards the moon until you came near enough to feel the pull of the moon, on to which you would fall. You would certainly fall so hard that that would be an end of you, especially as the moon has no air to break your fall.

But if this did not happen you would be pulled into the sun. If the earth stopped moving round the sun at this moment, it would fall into the sun. Other things might happen to you, too. If the earth's attraction still remained, you might move round and round it and become a sort of second moon! The moon, we know, really fell off the earth to begin with.

THE NEXT QUESTIONS BEGIN ON PAGE 1159.

THE FIRE BURNING INSIDE THE EARTH

The earth is a great ball, the inside of which is solid and very hot. Between the hot inside and the cold crust is a layer that is on the point of melting; and if at any time the crust should break and open a passage to the surface of the earth, then this layer will melt and the molten rock will come out and form a hill called a volcano. The hot molten rock is called lava, and at times it flows over fields, burns forests, and destroys villages or towns if they happen to be in its path. But if water finds its way into the passage of the volcano, then explosions take place and hot gases, smoke, ashes, and rocks are thrown up into the air as shown in the fine photo of Vesuvius on this page. At times volcanoes burst with great violence, and Vesuvius, the great volcano of Italy, has destroyed whole cities, one of them, Pompeii, which was overwhelmed soon after the birth of Jesus Christ, having been dug out of the earth, so that to-day we see it as on page 6221.

A clavichord, one of the instruments used before the invention of the piano.

HOW WE GOT THE PIANO

CONTINUED FROM 951

IN the early days of the world, ages and ages ago, a hunter shot at an animal that he wished to kill for food. His bow was tightly strung, and as he loosed his arrow, the string sounded a high, clear, musical note. Full of curiosity, he twanged it with his fingers, and found that he could get the sound again. Soon every man in the village was twanging his bow, and that is how the first beginning of all our beautiful harps and violins and pianos was made. Of course it took a long time for the piano to evolve or grow out of the bow string, and the people of many ages and many countries helped its growth.

THE HARP THE FIRST STRINGED INSTRUMENT

The harp was the first instrument with strings that began to take shape and grow. Some rude musician of those far off days discovered that he could make a larger number of sounds with two strings than one, and so another string was added, and then another and another. All this was done so long ago that we cannot even follow the steps that were taken. But we know that the ancient Egyptians made harps, with many strings, of a beautiful shape, that they knew that sounding boards increased the tone and made it richer, and that they had learned how to tighten their strings on pegs. Probably the Hebrews learned from the Egyptians how to make and use the harp, and we know that many of their psalms or sacred songs were written to be sung to its music. The Assyrians too made harps, and they also played on dulcimers, in which the strings were struck by hammers. This was the first instrument on which music was made by striking strings with a hammer, and that, you know, is how the piano is played. The Greeks knew a good deal about music. Centuries before the coming of Christ, they learned, perhaps from the Egyptians, how to measure the intervals of a scale on a little instrument called a monochord. This was only a string stretched tightly across bridges, but, as we shall see, it led to greater things. Later on in history the Irish people made very fine harps, and at one time it seemed as

Copyright, 1918, by M. Perry Mills

if they would lead the world in music. It is believed that from them the Italians learned to make the harps for which they became famous.

THE CLAVICHORD, WHICH HAD KEYS

In the early centuries and in the middle ages, when no musical instruments were used in the churches, the monochord was used in teaching the intervals of the chants to the youths and young men who sang in the choirs of the cathedrals and monasteries. By and by its usefulness was increased by adding more strings, and it is thought that the first idea for the clavichord was taken from a monochord with three or four strings.

Sometime, probably in the fourteenth century, some one invented the clavichord, and this was a big step towards making the piano, because the clavichord had keys. This instrument was made like a box, inside of which there were a number of strings stretched across bridges. At the end of each key of the clavichord there was an upright piece of brass called a tangent. When the key was pressed the tangent sprang up and, by striking against one of the wires, produced a note. About a century after the invention of the clavichord, the spinet or virginal came into fashion in England. This was the instrument on which Queen Elizabeth played, and was very like the harpsichord, which came later. In both, a wooden arm set upright at the end of a key held a tiny quill which sprang up and twanged the string, and then fell back again. The harpsichord was shaped very much like a grand piano. You see we are coming very near the piano, and also very near our own time. The great composers, down to Mozart and Beethoven, wrote for the clavichord and harpsichord. Bach improved the clavichord by tuning it so that a new scale could be commenced on any note in the octave, and in their early days Mozart and Beethoven played on both instruments.

THE FIRST PIANO WAS MADE IN ITALY

The first real piano was made in Florence by an Italian named Christofori, about the year 1709, not much more than two hundred years ago. It was called a pianoforte because it could be made to give either soft tones or loud ones, and the name has been shortened to piano, which simply means "soft." Christofori made a number of pianos, but only two are left in the world. The older of the two is in the Metropolitan Museum, and when you pay a visit to New York, you must be sure to make a pilgrimage to see it. At first the new instrument was looked upon as a curiosity, but it was soon made in Germany, France and England. Many improvements were made in it in each country and in a short time it came into general use.

THE FIRST AMERICAN PIANOS

The first pianos seen in this country were made in England, but it was not long before we made them ourselves. In 1775, John Behrend, of Philadelphia, built the first piano ever made in America. Pianos have been built here ever since that time, and for many years no country in the world has been able to make a better piano than is made here. At first the frame work of a piano was all of wood, but it was found that this was not strong enough.

In 1800 an English engineer, who lived in Philadelphia, built an upright piano in which he used an iron frame. He took it to London, but he was not successful in either city as a piano maker. In 1820 a Scotchman named Allen made a piano frame of iron tubes. This was improved on a few years later (1825) by Alpheus Babcock of Boston, who made a cast iron frame for a square piano, and in 1843 James Chickering of the same city made a full iron frame for a grand piano. In 1855 Henry Steinway, a German who had come to live in New York, made a great improvement in the way of placing the strings in a piano, and so you can see America has had a large share in producing the wonderful instrument that we know to-day. Many other inventions have been made in connection with the piano, but it is impossible to tell them all in a short space, and we have here the main outlines of this interesting story.

HOW THE SOUND IS MADE ON A PIANO

And now we want to know how it is that by simply striking the keys of

a piano we can make music. Music we know is sound, and sound is caused by vibration. It is easy to understand the vibration caused by drawing a bow across the strings of a violin, but the strings of the piano seem a long way off from the keys.

The answer is very interesting. Every key in the piano is a lever attached inside the case to a balanced piece of mechanism, which ends in a hammer made of thick felt. This mechanism is called the action. But though this is an important part of the piano, it is only part. If we raise the cover of the piano we shall see that there is a strong iron frame, shaped something like a harp. Across this steel wires are strung, and stretched so tightly that if they were not immensely strong, they would break, and if the frame were not immensely strong, it would bend, or the pegs round which the strings are drawn, would pull out.

THE DIFFERENT SIZES OF THE STRINGS

Down below the wires, or behind them, in an upright piano, there is a sounding board, and glued to the sounding board, we can see the bridges, on which the strings rest. Some of the strings are longer than others, some of them are thicker and heavier than others. Those on the right hand—the treble side—are quite short, but they keep growing longer and longer, until the strings at the left hand side, for the deep, low tones of the bass, seem to be too long for the case, and to find room, they are stretched at another angle *across* some of the shorter strings. This is called overstringing. The strings are of very strong steel wire, which must be made in a particular way, so that it will give a full, round tone. The strings of the very low bass are covered or "overspun" with fine copper wire, to make them vibrate more slowly. Every string belongs to a particular key, and most of the keys have three strings belonging to each of them. The low notes have only two, because they are thicker and "overspun" and so can make a heavier sound.

Now let us go back to the keyboard, and strike a note, let us say middle C. Immediately its hammer springs up and strikes the three strings that have been tuned to sound this note in unison. The strings begin to vibrate. The bridge vibrates in unison with them. The sound is carried by the bridge down to the sounding board, and the air all around is filled with waves of sound. That is how music is made on the piano. The beautiful story of waves of sound, how they are started, and how they are carried to the ear, is told in the part of the STORY OF THE EARTH which commences on page 4579 and in the BOOK OF OUR OWN LIFE on page 3913.

Two keyboards, for soft and loud music, were not unusual in a harpsichord, the instrument which we see here. The harpsichord was a forerunner of the piano.

Pictures on pages 1087 and 1089 by courtesy of The Metropolitan Museum of Art.

Many of the boys and girls who are learning to play the piano often ask how the instrument is made. This is a natural question and to answer it for the readers of THE BOOK OF KNOWLEDGE pictures have been specially made which take us through one of the great factories which have made American pianos famous. These pictures are on the following pages. They commence where men who are skilled in a knowledge of wood pick out the pieces to be used in particular parts of the piano and bring us straight through the factory, explaining the process of making as we go, until we find ourselves in the wareroom before a finished instrument.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1131.

HOW THE CASE OF A GRAND PIANO IS MADE

The first step in the making of a piano is careful choice of wood. The planks chosen must be well seasoned, so that they will not crack or warp. After this is done they are cut into proper shapes and sizes and are trimmed and planed to a satin-like smoothness.

The next step is the making of the case. Layers of very long, very thin pieces of wood are put together with thin glue between the layers. The wood is then bent in large presses, into the shape of a grand piano, and, as the glue sets, the wood becomes a solid piece of the proper shape and thickness, and of very great strength.

All pictures by courtesy of Steinway & Sons.

FINISHING THE CASE AND MAKING THE SOUNDING BOARD

When the wood leaves the press it is called a "rim" and is turned over to a man, called a case-maker, who fits and glues into it cross-pieces and braces to hold the case in shape. This picture shows one man preparing to fix a "rim" to his table and another at work making a "rim" into a "case." It is then sent to be varnished.

The case of the piano is beautifully varnished, and is then ready for the sounding board, which the man in this picture is making. The sounding board, which is a thin sheet of very light wood, is slightly arched, to resist the tension and weight of the strings that are afterward stretched across it. The bridge is put in above this board.

PUTTING IN THE STRINGS AND KEYBOARD OF A PIANO

Meantime a strong iron frame, to hold the strings, has come from the foundry. When the sounding-board and bridge have been glued in, the frame is bolted in above them. The strings are then put in, so that each will touch the bridge, and are drawn tight round the strong iron pegs, which are set in the frame to keep them in place.

After the piano has been strung, the keys and the mechanism, which carries the energy from the fingers to the strings, are put in the case. The felt hammers which strike the wires are made in a press and are at first very hard, and are pricked with a sharp steel point to make them rough and soft enough to produce a mellow tone.

1002

HOW THE KEYBOARD OF A PIANO IS MADE

The keys of a piano are made from one board, which is not sawn apart until the ivories have been glued on and polished. The keys, which are much longer than the ivory-covered ends which we see, are put in a frame in which each key is mounted on a pin which acts as a pivot. The key is really a lever which moves the hammer.

The mechanism by which the keys of a piano work is called its "action." There are a number of parts in each "action" and its operation is performed by a complicated system of levers. The separate parts of the "action" are screwed on a frame that is mounted on the key frame. These men are screwing the action to the frame.

THE END OF THE STORY OF HOW A PIANO IS MADE

In this picture a workman is testing the level of the keyboard of an upright piano in which we can see a good deal of the "action." If the keys are too low, or if they are uneven in height, the man will have to level them by putting paper punches under them. Here you can see the frame and strings at the back of an upright piano.

We have followed the making of a piano from the selection of the rough wood and now we have a finished instrument such as many of us have in our homes. Most children can learn to play the piano so well that they can give pleasure to many, if they will work as carefully as the men who make these beautiful instruments for them.

A HANDY WRITING-BOARD

CONTINUED FROM 941

MOST people who have once used a writing-board know how convenient it is, and would be sorry to part with it. We can hold it in the lap and be independent of a table or writing-desk, carry it out of doors and sit on the grass or in a boat, or lie in a hammock while using it as we write to our friends.

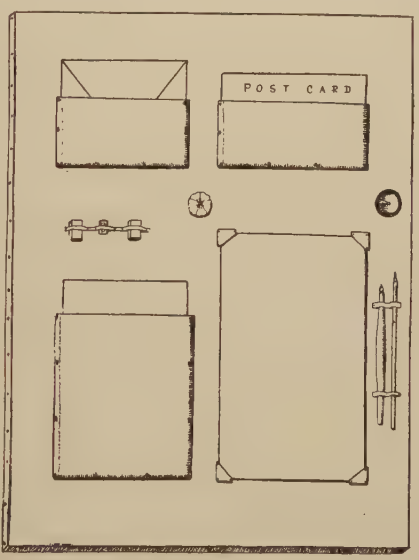
The writing-board is quite easy to make. We shall need a piece of board, cut about fourteen inches by twelve inches, and neither too heavy, nor too thick. Three-eighths of an inch would be thick enough. Some drawing-boards are made about this size; in fact, an old drawing-board might well serve the purpose.

For the cover we can get some waterproof cloth, choosing a pretty art color. One is sold measuring three feet nine inches in width at twenty-five a yard. If we prefer it, a green baize or felt may be used. Half a yard of the waterproof cloth would be enough, since it is forty-five inches wide. Some small brass-headed nails and a yard of broad black elastic will also be wanted.

The first thing to do is to cut the waterproof cloth to the shape of the board. It should cover the board, front and back, and be tacked neatly round the edges of the board or on the back.

Next we cut out three pieces of the oil-cloth to form pockets for the note paper, envelopes, and postcards, according to the size of those we use, taking care to make the cloth wide enough to allow for a good supply of these. The pockets will bulge, but that does not matter. We do not need to cut the pockets quite so deep as the notepaper and envelopes, the upper part of which should show at the top of the pockets. They can be fastened on to the board with the small brass nail.

A good arrangement would be that shown in the picture, with notepaper in the bottom left-hand corner, envelopes in the top left corner, and postcards in the top right corner. For the bottom right-hand corner blotting-paper may be cut out and folded into a pad. Its corners can be inserted into little triangular pieces of the waterproof cloth nailed in position as shown. To the right of the blotting-pad two pieces of broad elastic are nailed to hold the fountain-pen and pencil. Between the notepaper and the envelopes we nail a piece of the elastic across to hold indiarubber, ink-eraser, and stamps, taking care that the centre loop is tight to the board for holding the stamps.



Writing-board with stationery, ready for use.

Of course, it is possible to fasten everything to the writing-board by bands of elastic, but the pockets keep the notepaper, envelopes, and postcards cleaner than if they were exposed.

A neat little addition to the writing-board is a small pen-wiper cut out of two or three rounds of cloth and nailed above the blotting-pad. In the event of an ordinary pen being used instead of a fountain-pen, a tiny safety ink-pot will be needed. In that case, a hollow can be grooved in the wood for this before the board is covered with the waterproof cloth, and a hole cut in the latter for the insertion of the pot. It would need strapping on to the board with elastic, and the suitable place would naturally be to the right of the blotter, above the pen and pencil. The board is now quite ready for use.

SOME FAVORITE GARDEN GAMES

BOWLS

BOWLS is played on a smooth lawn; any number of players may take part in the game. The "jack" is a yellow ball which is placed on the grass near one end of the lawn. The players take their places at the other end, with one bowl each. These bowls are large wooden balls, made heavier on one side than the other, so that when they are rolled towards the jack they never roll in a straight line. This must be remembered in sending off your bowl, or it will travel in a curve which ends a long way from the point at which you aim. Those whose bowls stop nearest to the jack win the game.

DICKY SHOW A LIGHT

THIS is played in the open air after dark. "Dicky" carries a bullseye lantern, or a pocket flash, the light of which he hides with his hand, or a shade, until some distance away from the other players. He then suddenly shows the bullseye, and the others dart off in its direction to capture him. But the light is hidden again, and Dicky slips quietly away in the dark, and shows the bright beam just where no one expected to see it. In this way the chase is kept up for some time, for the more silent Dicky is, the better his chance of escape, while those who would catch him should be very silent too.

CONQUERS

BORE a hole through a chestnut and thread it on a piece of string with a knot at one end, to stop it from slipping off. This is a conquer. The game is played by one boy holding his conquer up, hanging from his hand, while another strikes it with his own threaded chestnut. If it does not break under the blow, it becomes the attacker, and turns are taken till one of the conquers is "killed." It is best to use chestnuts that are dry. The string should not be too thin, or it will cut into the conquer, and end its career in a very short time.

BOUNCE ABOUT

TWO players, with two marbles, play this game. The larger the marbles the better. One boy throws his marble down. If his companion can hit it with his own, he wins 10 marks, and has the right to try again, aiming from the spot at which his marble stops. He may keep on till he misses, when the other player takes a turn. A certain number should be fixed upon—say, 100—and the player whose marks reach this first will be the winner. Sometimes this game is played with smooth pebbles.

CATCH THE SALMON

THE two boys who want to "catch the salmon" carry a piece of rope between them, each holding one end. The "fish" are on the other side of a chalk line, across which catchers must not pass. Carrying their rope to this line, they try to throw it over any "fish" who come too near, and, when they succeed, the captive must not do anything with his arms to get free, though he may jump and struggle if he likes. Once across the line, he is on land, and must give himself up.

AUNT SALLY

AUNT SALLY is a black doll. She wears a white cap on her head, and a white cape on her shoulders, and carries a pipe loosely in her mouth. Her body is only a stick with a pointed end, and when this is pushed into the ground she is ready for the fun to begin. The players stand at a distance of some yards and (each in turn) throw at the pipe with a number of short, stout sticks. Those who knock it out of her mouth the greatest number of times win the game, but those who cannot aim straight must not be surprised if Aunt Sally seems to smile at their vain efforts.

BUNG THE BUCKET

ONE boy stoops with his head against a wall, another boy stoops behind him in a like position, and then a third, and then a fourth, until there is a long line of "backs." They are the "buckets." When ready, the "bungs," following one another, leap astride, the first bung working his way up till he reaches the boy against the wall. When all the bungs are mounted, they sing a rhyme, swinging about from side to side. If the "buckets" do not break down, they are counted the winners, and the "bungs" have to try again. Sides are not changed till one of the "buckets" gives way.

BASTE THE BEAR

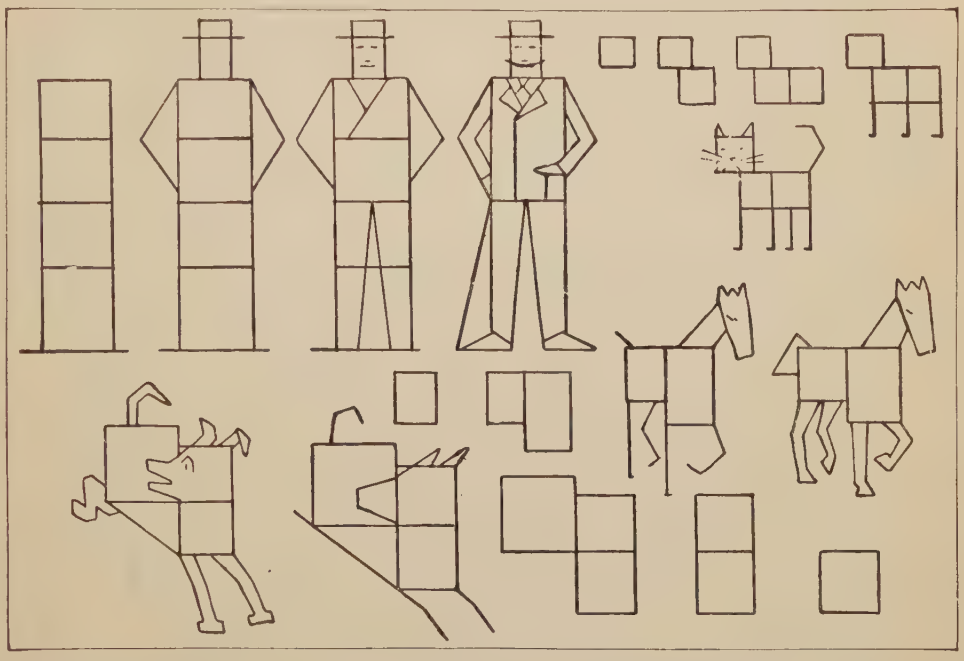
THE "bear's" den is a circle scratched on the ground, and the bear moves about it on all fours. A rope is round his waist, and the other end of this rope is held by his keeper, who makes up his mind that he will shield his poor bear from all comers. To do this, he carries in his other hand a handkerchief, with one of its corners tied in a knot. "Ready!" cries the bear, as he crawls about in his den. At the word, the hunters come and baste him with their knotted handkerchiefs. He may do what he can to save himself, but he must not crawl out of the circle. The keeper tries to drive them off, and if he succeeds in hitting one the bear becomes the keeper, and the boy who is hit takes his place in the den.

BLACKTHORN

AT the end of the garden a chalk line is drawn, and between that line and the wall is a "base." The rest of the garden is open country, and one boy, who is called "Fox," stops in it to catch any of those who run across from base to base. When he succeeds in making a prisoner, he must be able to hold him while counting up to ten. Then the captive becomes a fox as well, and together they do their best to make fresh prisoners. Of course, the more foxes there are the more dangerous it is to pass from base to base, and only the strongest and most daring are able to get across. Once started, no one must turn back. The last player to be made into a fox has shown himself the best and strongest runner.

QUEER PICTURES BUILT UP FROM SQUARES

THE quaint system of drawing by using squares as a basis, building up square upon square, and adding what necessary lines are needful to complete the picture, has been invented by a French artist. This group of illustrations shows four subjects, a man, a cat, a horse, and a dog, drawn by this use of squares. Look at the man. First four squares are made, one on top of the other; then two lines at each side of the top square give the outline of the arms; a tiny square, a horizontal line, and a rectangle represent the head and the hat; four lines give the features of the face; a series of simple straight lines in the topmost large square make the coat and the tie; the arms are completed in the manner shown; then an inverted V separates the two legs; the feet are made by two triangles, and the stick and moustache are added; finally the few superfluous lines are rubbed out and the man is complete. To make the cat from three squares as a basis is even simpler, and the method to be followed for it, and also for the horse and the dog, is clearly shown in the pictures on this page.



A TRICK YOU CAN PLAY WITH A BOOK

THIS is a trick of a really startling kind, which will puzzle even the wisest man if he does not know it.

You invite someone, the older and wiser the better, to take down any book he pleases from the bookshelves, to open it haphazard, and to choose a word in the first nine lines of any page, and not later than the ninth word in the line. He is then to notice the number of the page, and multiply it by 10. To the product he is to add 25 and the number of the line. The result thus obtained is in turn to be multiplied by 10, and the number at which the word stands to be added to the product.

He is then to hand you the book, with a slip of paper on which are written the figures last obtained. After thinking for a few moments you open the book and read out the word chosen.

To obtain this surprizing result, all that you have to do is to subtract in your mind 250 from the amount given you on the slip of paper handed to you.

The last figure of the answer will give you the number at which the word stands in the line, the last but one the number of the line, and the remaining figures the number of the page.

Suppose, for instance, that the person choosing the word had happened to choose the fifth word in the ninth line of the eighty-fourth page. In such case the process would be as follows:

$$\begin{aligned} 84\times 10 &= 840 \\ 840+25+9 &= 874 \\ 874\times 10 &= 8740 \\ 8740+5 &= 8745 \\ 8745-250 &= 8495 \end{aligned}$$

And 8495, dissected as explained, gives 84, 9, 5, being the three clues necessary to the discovery of the word.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF JUNE

MANY people seem to think that when all the plants have been put in place for the summer, and the garden is becoming full of gay-colored flowers, there is little or nothing to do. But there is always work that may be done.

Watering alone when the weather is very dry is an important work that needs a good deal of thought and care. The chief thing to remember is never to give water until it is needed, and then to water thoroughly. Just a mere sprinkling of water through the rose of a can to strong, sturdy plants that are thirsty and needing a good drink *is worse than useless*. This is the reason: when we water a plant we want it to take up the moisture through the roots, and if we merely sprinkle the surface of the soil with a little water it encourages the roots to remain near the surface, and they suffer from the heat of the sun. What we want to do is to make the roots go as deep as possible in search of moisture and therefore, you see, we should give sufficient water to penetrate the soil to a sufficient depth. One really good watering when it is needed is better than half a dozen little sprinklings.

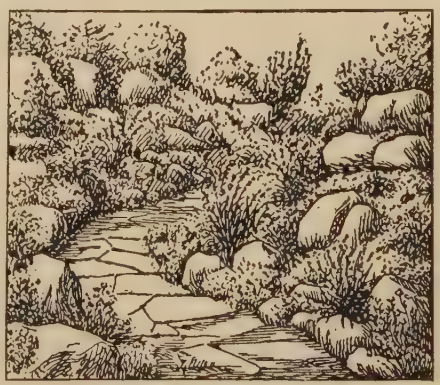
During a very dry time the hoe becomes an invaluable tool, not to uproot weeds merely, but to keep the surface of the soil stirred and loose between the plants. This should be done frequently, using the hoe where possible, or, where there is fear of cutting through the stems of our flowering plants, the little short-handled fork may be used to prick up the surface soil. The use of this operation is very interesting. This has never perhaps been stated more clearly and simply than in the pages of an American magazine, which says:

"The drops trickle down and down from one grain of soil to another, until they reach a layer of rock or clay so hard as to stop their course. This point is called the 'water table'. But water can never remain in the soil. As soon as it ceases to trickle downward, it turns about and begins to climb upward. From one grain of soil to another, wherever their edges touch, it creeps along. It moves rapidly where the soil is snugly packed, but much more slowly where it is broken into bits and lumps. . . Here is the secret of the fertility which comes from continually keeping the soil loose at the surface in dry weather. It helps to retain the moisture below, where the thirsty roots can make use of it."

We shall not be likely after this to let the surface of the soil become parched and hard; a great deal of watering will scarcely be necessary this month probably, but as the summer advances more will be needed. All the same, we must try to discover which plants require plenty of moisture, and which naturally enjoy plenty of sunshine and dryness. Such plants as snapdragons, rock roses, sea lavenders, and geraniums like to be fairly dry, while musk, hollyhocks, phloxes, and pansies, among other things, like considerable moisture.

A quantity of small stones spread over the ground around plants is a capital means of keeping the soil cool and moist, for you will find, long after you have watered, that the moisture is retained by the stones instead of being evaporated by the sun. Of course, we should not use these stones to a great extent; they are useful where a moisture-loving plant has been put in a dry spot.

It may happen sometimes that we wish to prevent a plant from flowering for a time so as to prolong our gay display of blossoms. We can do this with many plants by merely pinching out the tips of the growths. This operation will have another effect beside retarding the flowering. It will make the plant bushier and thicker, and when the flowers do come there will be many more of them, though the flowering heads may not be quite so fine. Among the plants that may be treated in this manner may be mentioned the well-known old favorite snapdragon and the blue annual cornflowers.



A rock garden for the autumn for which we must begin to prepare in June.

In the autumn we will learn how to make a small portion of our plot into a rock garden, or, at any rate, a rockwork edging. To enable us to stock it when it is made we may sow now in some cool position—and perhaps it will be better to make the sowings in pots—such things as stonecrops, aubrietia, rockfoil, and perennial candytuft. Some of these seeds are very small, so that the covering of soil above them should be the merest sprinkling of very fine soil.

After the seeds are sown a piece of glass may be laid over each pot, and a piece of brown paper over that. The glass must be turned over or wiped every day, and even twice a day. It will be found covered with tiny drops of moisture. Seeds in pots need very careful watering—in fact, rather than water from a can, it is better to take the pot and plunge it to the rim, holding it there a few moments until the surface becomes moist.

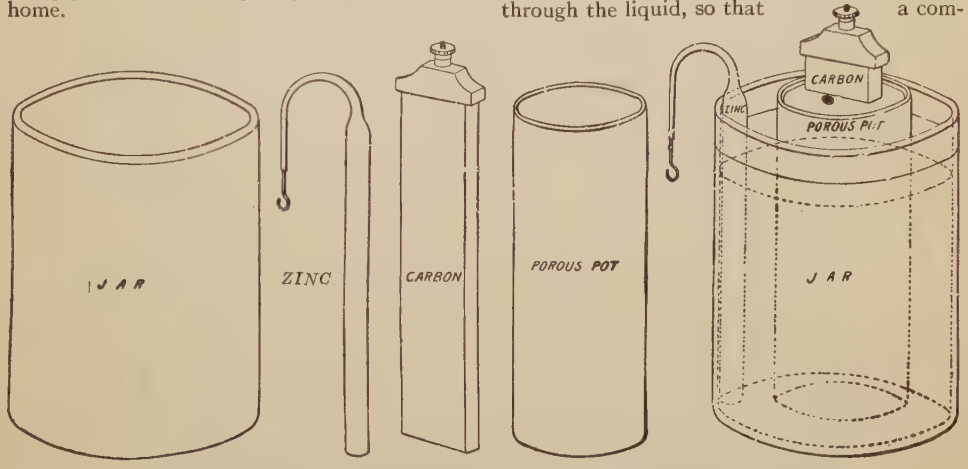
A CHEAP WAY TO MAKE AN ELECTRIC BATTERY

WOULD you like to have an electric battery to make that wonderful thing electricity? It costs very little, and a whole host of experiments can be made with its help.

Although all kinds of electric batteries produce the same thing—electricity—yet they are very different in form. We shall show here how to make a battery so simple that it does not need dangerous acids to work it. This type of battery was invented by a Frenchman whose name was Leclanché, and it is used more than any other for working the electric bells which are put in houses. You will not be able to make the parts themselves, but they can be bought cheaply; and one thing may be obtained at home.

pot can be bought at any electrical dealer's shop, where you can also get some of the necessary chemical, called sal-ammoniac, say, a quarter of a pound, for preparing the solution which makes the battery work. Put about two ounces in a pint of water—which may be warmed—and let it dissolve; then pour the solution into the jar, and stand the pot and the zinc inside.

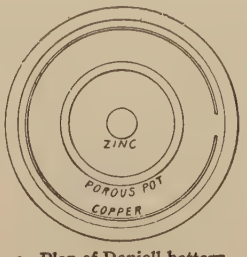
This completes our battery, and it will begin to work when a couple of clean copper wires, one attached to the zinc rod and the other to the terminal on the pot, are brought together. A current of electricity then flows from the pot through its wire and round again to the zinc rod, making a continuous connection through the liquid, so that a complete circuit is formed. By placing certain things in the circuit—that is, between the two leading-out wires—the electricity can be made to do work, such as ringing a bell, and it is not even necessary to have the bell close to the battery, for the latter is generally placed in a cupboard some distance from the bell. The current is turned on and off by means of a push, the construction of which we shall see later, when a bell will be described.



1. A Leclanché electric battery and its parts, which can be bought cheaply and made up

Ask your mother if she has an empty jam or marmalade pot about six and a half inches high. You will require a round zinc rod, costing a few cents, and a porous pot fitted with a stick of carbon, which is packed round with crushed carbon and black oxide of manganese. You cannot see the inside, because it is closed over at the top and fitted with a terminal screw different from the zinc rod, which has only a projecting wire. In the drawings we have, first, the jam-pot, then the zinc rod, the carbon stick, the porous pot, and at last the complete battery.

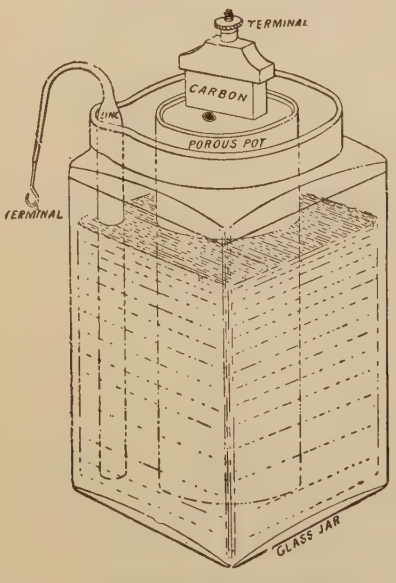
Two little tubes are let into the top of the porous pot before it is sealed up, to allow the escape of gases which are produced when the chemicals are at work. The tops of the rod and the pot are coated with a black substance; this is put here to prevent the salts in the solution from creeping up and depositing as white crystals on the surfaces. It is best to treat the jam-pot similarly by giving it a couple of coats of Brunswick black inside and out, for about an inch down from the top, as shown by the lines running round in picture 1. The zinc rod and the porous



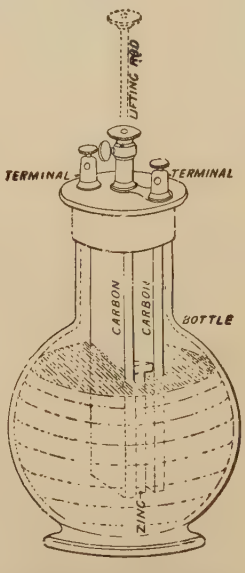
2. Plan of Daniell battery

Although the porous pot will not allow its contents to escape into the outer jar, the earthenware is sufficiently porous, or open, to let the sal-ammoniac solution soak inside. After a while you will notice that the liquid is lower than when first put in; this is because the pot has absorbed a certain amount, and it must be replenished by pouring fresh solution in. After a battery has been in use for some while, the porous pot becomes saturated and cannot suck up any more, but the solution will still lower gradually, because the air dries it up. The only other waste that occurs is that of the zinc rod, which is very slowly eaten away. This zinc is called the positive element, and the carbon stick is

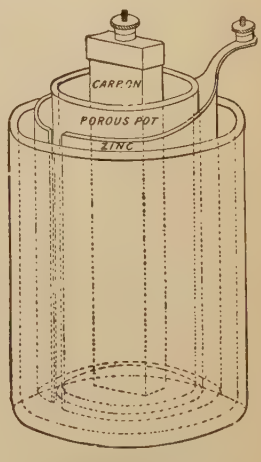
the negative element. If you do not mind a little extra expense, it is better to buy a glass jar specially for the battery, which is sold in the shop where you get the other parts. This will be supplied ready with the protective coating around the mouth. Our battery then looks like picture 3, which shows the glass jar filled to the proper level. There is a lip into which the zinc rod fits. The square shape is used because that is most easily packed, and allows batteries to be placed close together when a number of them are used. Really, what we have made is only a cell; a battery proper is formed when two or more cells are used together, to give greater strength and endurance. Then the wire of a zinc is coupled to the teminal of a carbon in the next cell, and so on with as many cells as are used, the final leading-off wires therefore coming from a zinc at the one end and a carbon at the other. It is necessary to have the wires and the terminals perfectly clean before coupling them together; it is usual to scrape the surfaces with a knife, otherwise dirt and oxide on the metal will prevent the full current from passing.



3. Leclanché battery in glass jar



4. Bottle bichromate battery



5. Bunsen battery

A cell which gives a stronger current for its size than the Leclanché is the bichromate, so named because the solution is made from bichromate of potash dissolved in water with a little sulphuric acid added. It is very important that the acid should be poured in very slowly, to avoid the liquid bubbling up and scattering. But you can buy what are called chromic acid salts, which form the required solution when put into water.

The elements in the bichromate battery consist of two carbon slabs, between which is a zinc plate, shorter than them, this being slowly consumed while the battery is working. But the solution would eat it away all the same if the cell were on a shelf and not used, so an arrangement is made by which this zinc can be lifted out of the solution with a rod and held suspended until it is wanted again; the carbons remain, as they do not suffer. The most convenient receptacle for a bichromate battery is a bottle (4), such as is sold in the shops, with a brass ring around the neck. The carbons are secured in an ebonite cover, on which stand two terminals, one connected to the zinc and one to the two carbons, the ebonite being an insulating substance which does not permit the current to flow from one to the other, and cause what is termed a short circuit, which would render the battery useless. In picture 4 the zinc is seen lowered into the solution between the two carbon slabs, while the dotted outline of the lifting rod shows its position when raised to hoist the zinc up out of the solution. You can buy the carbons and the zinc ready mounted in a top with terminals complete, and put it yourself into a jam-jar of suitable size.

A cell which is used to a great extent for working telegraphs is the Daniell cell; the usual arrangement is that of an encircling pot of earthenware in which stands a circular copper sheet having a terminal. A porous pot stands inside this and holds a zinc rod also fitted with its terminal. The porous pot contains dilute sulphuric acid—that is, with a lot of water, and the outer jar a saturated solution of copper sulphate, or bluestone. By saturated solution is meant that the water cannot dissolve any more bluestone, so that it is as strong as possible. In picture 2 you can see how the parts of a Daniell battery would look from above.

A stronger cell, the Bunsen (5), is objectionable because it needs nitric acid to work it, and this gives off nasty fumes, which are not only unpleasant, but also dangerous.

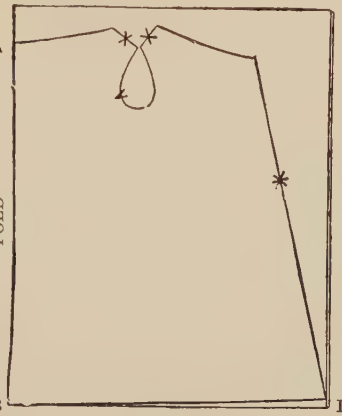
There are many cells now used which have no liquids in them, so that they can be carried about without risk of spilling the contents. These are called dry batteries.

WHAT TO DO WITH A GIRL'S WORK-BASKET

6. THE DOLL'S LITTLE FROCK

WE have by this time learned how to cut our little paper pattern and lay it on the material. The little frock illustrated here is quite a simple one. It is made entirely in one piece, with only two tiny seams on the shoulder and one in the centre of the back. The two armholes are for the little puff sleeves, which are also made in one piece, with a little seam under the arm.

The first thing to do, after the paper pattern has been laid on a fold of the material, as shown in the picture [1], and cut neatly all round, *except between* A *and* B, is to make the seam at the back. This is marked C D in the picture. A little French seam such as we have already done for the underlinen will do very well for this little frock, especially if you have been able to coax mother to give you a piece of Japanese silk, or some other thin material.



1. Pattern of the frock

2. Sleeve pattern

3. Back of the frock

Do not make a seam at the back right up to the top of the neck, but leave a placket-hole rather more than half-way up, just about where the star is marked on the picture. This placket-hole is made very much like we made the slit on each side of the knickers. Turn to page 848 if you have forgotten how this was done.

Three or four little buttons and buttonholes are needed to close the frock, so in this case the under part of the placket-hole, which would be the one to receive the buttons, must have a false hem as well as the top one, to make it strong enough for the buttons to be sewn on.

The next step is to make a hem, and this for a doll's frock should be about two inches wide all round, with a quarter of an inch turned inside. Over this hem a row of feather-stitching should be worked; this makes a pretty little ornament for a doll's frock.

The neck part of the frock is simply gathered into a little straight band, which is first run edge to edge with the main part of the frock, and then hemmed over the gathers. If this little band is made broad enough, it can be doubled over to form a little turn-down collar, which may be ornamented with feather-stitching, while a lace frill may be added to make it daintier.

4. The frock finished

A wide tape sewn inside at the waist-line, rather low down, will, if sewn top and bottom all round, act as a slot in which a fine silk tape may be put through to gather the little frock as picture 3 shows.

The pattern of the little sleeve is plainly shown in picture 2. The part between E and F in the picture is the top part, and when gathered and the thread pulled up will form the little puff.

Join the line E G to F H by a French seam, and then you will begin to see the shape of the sleeve. The top full part is gathered, as we have said, drawn up, and made to fit the hole left for it in the frock. The little seam under the arm is put where the notch is seen in the pattern—that is, under the arm, slightly to the front. The bottom of the sleeve —that is, the part between G H in the picture—is also gathered and then put into a straight band of material, which is made large enough to turn over just like the little collar. This, too, is trimmed with a row of feather-stitching.

Sleeves are not very easy to put in, but if you are careful to see that the point E F (when these two edges are joined together) come against the notch shown in picture 1, you should not have any difficulty. Remember to arrange the fulness to come at the top of the sleeve, on the shoulder.

All that now remains to be done to the doll's little frock is to trim the waist part. The little frock shown in the picture has what is called a long waist—that is, the waist trimming is arranged to come much lower than the doll's real waist.

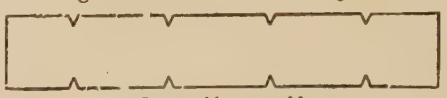
The sash of pale blue ribbon is threaded through some silk embroidery with big holes all round to take it. But if you cannot get any embroidery, the ribbon will look quite as pretty if it is put simply round, and tied in a bow at the back, or in two separate rosettes in front, as in picture 3.

If you do not like your doll to have a long waist, the tape should be sewn on about an inch and a half higher up.

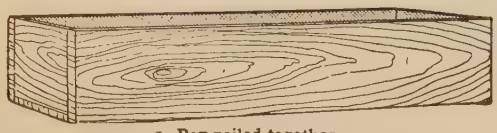
The last picture (4) on this page shows our doll dressed, looking as dainty and charming as any doll can.

MAKING A FLOWER-BOX FOR THE WINDOW

ONE of the easiest things for a young amateur carpenter to make is a box for the sill of the window outside, in which he may plant flowers. It is not the good fortune of everybody to have a garden plot, in which the taste for gardening may be encouraged and developed, but everyone has a window-sill, which he or she can make a source of delight and beauty. Even if one has a garden it is good to have a display of growing blossoms on the window-sill; it



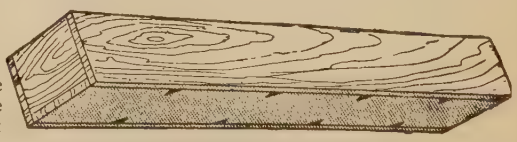
1. Shape of bottom of box



2. Box nailed together

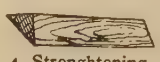
cheers the most sombre street, and if everyone did his best to beautify the street in this way, even the poorest quarters in our large cities would be brightened and made to wear Nature's smile. The expense of keeping a flower-box is almost nothing at all, especially if we make the box ourselves.

The box which we make should be as long and as wide as the window space will allow. Now, as windows are not uniform in size, no measurements that we could give here would fit every window. Thus, everyone must make a window-box that will fit the window into which the box is to be placed. We will suppose that our window has space large enough for a box 36 inches long and 8 inches broad. In this case we shall want one piece of wood 36 inches long and 6 inches wide for the bottom of the box. This should be fairly thick, not less than one inch, and if it is thicker than this it will do all right. We should have a number of holes in the bottom of the box to allow the water to run away when there has been too much put in. If the water were not allowed to run away, it would turn the soil in the box sour and prevent the flowers from growing. The easiest way to make the holes would be by using a brace and bit, but perhaps we do not have one of these tools in our outfit. So we shall do as well with only a saw or a chisel. We can make a lot of wedge-shaped notches in the edge of the bottom, say, four on each edge, as seen in picture 1, and these will make the holes, when the front and back pieces have been nailed to the bottom. Now we require two pieces of wood 36 inches long and 8 inches wide; these are for the front and back of the window-box. These pieces may also be one inch thick, although they will do three-quarters of an inch thick, but they should not be thinner than this. We need two end pieces, and they should be thick—not less than one inch, and preferably 1⅛ inch or 1¼ inch. The size of the two end pieces should be 6 inches wide and 7 inches long. Now we nail the pieces of wood together as seen in picture 2, the bottom and the sides going right from end to end, and the front and back sides coming down in front of the bottom. The bottom of the box, when nailed up, will look like picture 3, where we see the holes left for drainage. The end pieces go on top of the bottom and within the sides. The box is now made, but we can make it much stronger by nailing on strengthening pieces at the corners inside. These strengthening pieces should be triangular, like picture 4, say, 1½ inch wide, and if we nail some of these in the corners, both at the ends and into both the front and back bottom corners, it will strengthen the box very much. We should nail them to both the pieces against which they are placed, as indicated in picture 5.



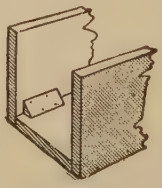
3. Box showing holes for drainage

It will be easy to take the sizes for these pieces, but we must be careful not to cover up the drainage holes with the strengthening pieces. The box is now made, and we have only to paint it; the color should be a leaf-green and we should give it not fewer than two coats.

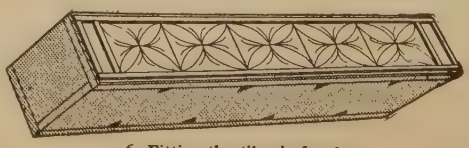


4. Strenghtening piece

Sometimes the front of a window-box is fitted with ornamental tiles. We can do this also if we like. We can usually buy from a carpenter or builder some odd hearth-tiles for a trifling sum. We had better have them 6 inches square, which is a common size, and they should all be of the same pattern if possible. We should require five for a box 36 inches long. We must measure to see what room the five tiles take on the front of the box. We can place them on the front of the box, which we have laid on its back. Then we nail on, right along the front at the top, and right along the front at the bottom, slips of wood about half an inch thick, or a little less, and about three-quarters of an inch wide, as seen in picture 6. The thickness of these slips should be the same thickness as the tiles. Now we nail on similar slips at each end, close up to the tiles, and, if there is room at the end, yet other slips right at the ends of the wood, all as seen in picture 6.

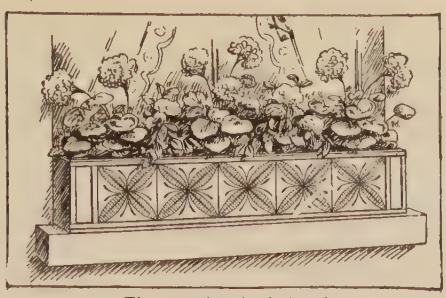


5. Strengthening piece nailed on



6. Fitting the tiles in front

Now we nail on other slips above these, and coming just a little way over the edges of the tiles so as to prevent them from falling out. It will be much better if we paint all these slips before nailing them into their places. We will, of course, have them leaf-green, the same color as the box itself. When we have done all this, we shall have made a very attractive window garden, such as is shown in picture 7, which shows it fitted into a window.



7. The completed window-box

After we have placed the box in position on the window-sill, and before we put earth into the box, we should put in broken pieces of crockery along the bottom two inches deep. This is necessary if we are to have proper drainage, because it is bad for flowers to be in sodden earth, from which the water is not free to run away. Then we put in the earth up to within half an inch of the top of the box, and when we have decided upon the plants or flowers we are going to have, we are ready to put the seeds, plants, or cuttings into our box.

It is well to choose for a window-box flowers of brilliant color which grow to be good big blossoms; to be effective it should have a good appearance from a distance.

Instead of filling the box with earth, we may have flower-pots standing in the box and containing the plants. This is a very good way, and enables the plants to be changed so that we can always have flowering plants in the window if we wish.

THE POTATO WOMAN AND HER PIG

DID you ever try to make toys out of potatoes? It is quite easy to do, as our two pictures clearly show us. We are going to make a queer little woman and her pig. You have heard that in Europe some very poor people nearly always keep pigs, which often share their humble cabins with them. These pigs are mainly fed on potatoes, and many of the poor people themselves have little besides to eat. So that there is something quite suitable in making a little woman and her pig out of potatoes.

For the little woman we shall want to get a rather long potato with a little round nob on the top. This little nob is to make our little woman's head.

If you cannot get a potato with a little nob on the top, you can manage in this way. Get a long potato with a rather sharp end; then get a tiny little round potato and fasten it on the end of the big one by pushing a very long pin through it. If this is nicely done, the pin will not show when the little woman is finished.

First wash the potato very nicely, but without breaking the skin. Now scrape two little round holes for the eyes, cut a curved slit for the mouth and a short slit just above it for the nose. If we can get two tiny little pins with black heads, they can be pushed in to make the pupils of the eyes.

THE POTATO WOMAN & HER PIG
made as described on this page

If you are clever with paint, you can take some of the red out of your color-box and paint the little woman's lips a bright red. Then add more water to the paint so as to make it paler, and carefully tint her cheeks a little.

The rest of the potato will form the body of our little woman, and this we must dress in a nice little frock made from green tissue-paper. If we put over this a white apron (also made from paper) it will look much better.

The arms and legs can be made of toothpicks or of long matches with the heads cut off. Next make a little bonnet just as you would for an ordinary doll, and tie it on with little white strings.

The pig is easier still to make, as you see by the bottom picture. Take a nice long potato, stick four matches in it to make the legs, and put in two large black-headed pins for the eyes. A curly bit of dandelion stem will do very nicely for the tail.

Sometimes, if you look you will find a potato with a kind of point at one end which looks just like the pig's snout.

LITTLE PROBLEMS FOR CLEVER PEOPLE

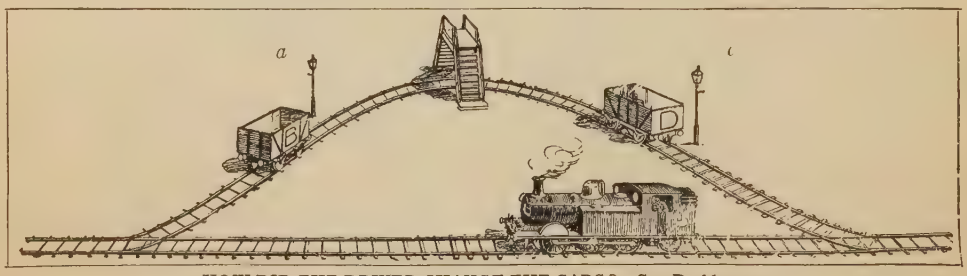
THE problems are continued from page 941, and the answers below refer to the problems given on that page.

COULD SHE BUY THE BOOKS?

56. "That set of books is $26," said Joan, "and I am afraid I have not enough money." "But you have $10.50 more than I have," said Janet, "and we have $45 between us." Had Joan enough to buy the books?

HOW DID THE ENGINEER DO IT?

57. The illustration on this page represents a railway line with a short loop line extending from one part of the main line to another part of the main line. In the middle of the loop line is a bridge, under which a car can be pushed by the engine, but which is too low for the engine itself to pass through. On the left side of the loop line, near the lamp-post marked A, is a car marked B, and on the right side of the loop line, near the lamp-post marked C, is a car marked D. The engineer is told to take car B to the lamp-post C on the right side, and to take car D to the lamp-post A on the left side, leaving them at these points, and then to bring his engine back to the main line. The main line extends further at each end than is seen in the picture. How did he perform his task?



HOW DID THE DRIVER CHANGE THE CARS? See Problem 57

HOW MANY PERSONS WERE THEY?

58. Jones arrived at the inn to arrange lunch for his party. "How many of you are there?" asked the innkeeper. "Well, we represent father, mother, uncle, aunt, sister, brother, nephew, niece, and two cousins." What was the fewest number that could be in the party?

HOW LONG TO MOW THE FIELD?

59. Evans and Watson mowed a field in a certain time. If each had mown half the field, Evans would have worked one day less and Watson two days more.

How long were they in mowing the field?

HOW MUCH MONEY HAS EACH?

60. Hugo and Harry run a race, the loser to pay the winner $1.25. If Hugo loses he will have just as much money as Harry, and if he wins he will have three times as much.

How much money has each?

WHAT ARE THEIR WAGES?

61. Thomas Bull and his two sons, John and Henry, work together. John and his father earn $2.25 a day, Henry and his father earn $2.50 a day, and the two sons together earn $1.75 a day.

How much per day does each earn?

HOW WERE THE DOCTOR'S VISITS DIVIDED?

62. "My doctor's bill for last quarter," said the squire, "came to $47.50." "How often did the doctor come?" asked his friend. "Twelve times," replied the squire. "He charged me $5 a visit for each night visit, and $2.50 for each day visit."

How many night visits were there?

HOW MANY MEN TO FINISH THE RAILWAY?

63. A contractor took an order to build 50 miles of railway within one year, and he engaged 225 men upon the work. After 7 months only 21 miles were finished. How many extra men would he then need to engage to complete the work as agreed?

ANSWERS TO THESE PROBLEMS ARE ON PAGE 1304.

THE ANSWERS TO THE PROBLEMS ON PAGE 941

52. 6,000 tons. It is plain that 160 tons is the difference between three barge-loads and one barge-load, so that each barge held 80 tons. And there were 75 barge-loads in the cargo, so that the total was eighty times 75 tons—i. e., 6,000 tons.

53. Three.

54. "At noon on August 30th." For 10 seconds an hour is 4 minutes a day, and at the end of each day the clock and the watch will be 8 minutes further apart than before. They will thus be 12 hours apart, and show the same time again in 90 days, since ninety times 8 minutes is 12 hours. In 90 days the watch has gained 360 minutes, or 6 hours, and the clock lost 6 hours, so that each points to six o'clock; and 90 days from noon on June 1st is noon on August 30th.

55. $8. The differences in the prices were $2, equalling half the value of the frame used, which cost thus $4; and as frame and picture were $12, the picture itself was $8.

THE NEXT THINGS TO MAKE AND TO DO BEGIN ON PAGE 1247.

WHAT THESE STORIES TELL US

THERE was very little between the Indian and the great forces of Nature. He lived at the mercy of the winter snows and rejoiced with the forests in summer. He shared the habits of the beasts, "learned their names and all their secrets;" thought of them as little brothers. For him each tree was inhabited by a spirit, every star the abode of magic. He knew how the hare came to have a split lip, and why the moon is flecked and shadowed.

INDIAN LEGENDS

HOW THE BEAR LOST HIS TAIL

CONTINUED FROM 1079

IT was midwinter. The snow was lying heavy on the ground and the lakes were all frozen over. A Fox slunk softly over the snow, his feathery tail drooping forlornly behind him. He had had nothing to eat for days, and he was very hungry. Presently through the trees he saw an Indian swinging along the trail pulling a sled load of fish behind him. The Fox lifted up his nose and sniffed the air. Oh! how delicious! If he could only get hold of two or three of those fish! His sides fairly pinched him with hungry longing. Silently as a shadow the Fox followed the trail of the Indian's sled. He noticed the bow and arrows slung over the Indian's back and the heavy club in his hand. He must not run the risk of being hit by that club. Ah, he had it! Breaking into a swift trot, he took a short cut through the woods and joined the trail about a quarter of a mile beyond. Flinging himself limply upon the ground, he lay there, his tongue lolling out, his eyes half closed and glazed. The Indian coming along saw the Fox lying in the snow, seemingly dead.

"What a fine skin for my wigwam," he grunted. And picking up the Fox by his tail, he flung the limp body upon his load of fish.

The Fox did not dare to move until he felt the sled slipping smoothly along under him. Then slowly, so as not to be heard, he pushed himself over to the edge of the load, and catching three of the biggest fish in his mouth, rolled off into the snow. Swift as a shot he was off into the woods with his booty. He met the Wolf, prowling along. The Wolf looked very lean and savage. His eyes brightened wickedly at the sight of the fish in the Fox's mouth.

"Where did you get that lovely fish, Brother Fox?" he asked smoothly, but he flattened his belly out along the snow as he spoke and crept a little nearer. Now, the Fox did not trust the Wolf. He told him how he had secured the food, backing further and further away, as he held the Wolf's attention by his tale.

"Why don't you go and do the same thing?" he finished hastily, and before the Wolf knew it the Fox was gone. The Wolf closed his jaws with a snap, as he realized how he had been fooled. But he was starved and must have food, so he decided to try the Fox's plan. He saw the Indian coming through the wood and threw himself upon the ground as the Fox had done. But the man was not to be tricked a second time. As soon as he saw the Wolf he uttered a whoop, and seizing his club, pounded the animal's sides, until it leaped up howling and fled into the woods. Murder was in the Wolf's heart. Everywhere he looked for the Fox, but in no place could he find him, and at last he gave up the search in despair.

Meanwhile the Fox was contentedly munching his fish under the shadow of a big rock. As the last delicious mouthful slipped down his throat, and he sat there licking his whiskers and looking very happy, who should come lumber-

Copyright, 1910, 1918, by M. Perry Mills.

ing along but the Bear. "How silly the creature looks, with his big paws and that long, bushy tail," thought the Fox. The Bear sniffed the air hungrily, and his round eyes inspected the Fox wistfully.

"Fish!" he mumbled, his mouth beginning to water. "Fish! Where did you get fish, Brother Fox?"

"What fun it would be to play a trick upon this stupid old Bear," the Fox thought. Aloud he said, "I got them out of the lake. If you will go down there and dip your tail in the water, the fish will bite. Then you can whisk them out upon the ground—all you want!" added the Fox generously.

"What a wonderful plan!" said the simple Bear, and off he set to the lake. Sitting down on the bank, he dipped his tail into the water and waited. He waited a long time, but no fish seemed to bite. He stretched his head around once or twice to see how his tail was getting on, but his neck was so short and fat he couldn't get even a glimpse of it. Presently he began to get tired and his paws to get numb from the cold. "I will take a little walk and warm myself up a bit," he muttered. He tried to get up, but found he could not move. The ice on the lake had frozen in about his tail. He became very much frightened. "What shall I do?" What—shall I—d-o-o?" he moaned to himself, fairly sobbing with terror. He pulled and pulled. Suddenly, with a snap he was free. But his long tail had cracked off behind him. The poor Bear cast one despairing look at his beautiful, bushy tail sticking in the ice, and galloped off into the woods. Everywhere he hunted for the Fox, getting angrier and angrier every minute. When he found the Fox he was fairly growling with indignation. "Come and fight me," he snarled furiously. "You little liar, come and fight me!".

"What for?" inquired the Fox, innocently. "I have done nothing." Then he almost laughed as he looked at the Bear, with his big paws, and his little stump of a tail flapping indignantly in the air.

"Oh, if that's what you mean," he went on, eyeing the remnant, "that's all your own fault, you know. You lost your tail because you were so slow." And flirting his own feathery plume under the nose of the exasperated Bear, he disappeared from sight. And this is how it came about that the Bear has a little stub of a tail, instead of a long, beautiful one like the Fox.

THE HAPPY LAND OF REST

IT was a day of great weeping and wailing in the wigwams, for the beautiful bride of the young Chippewa chieftain was dead. The young chief's heart was very sad. With his head bowed on his knees he was sitting in the Wigwam of the Dead,—the wigwam where his bride lay cold and still. He was a very brave young warrior, but he was not brave enough to bear his great loss. As he sat there with the sharp pain of his sorrow in his heart, there came to him the sound of voices talking outside the tent. At first he did not pay any attention to what they were saying. Then he caught the name of his bride. They were speaking of her, and the land to which she had gone—the "Happy Land of Rest." They said that mortals could reach that land if they would but travel far enough. The young chief's heart leaped up. A great resolve came to him. He would seek his bride in that distant place. With a quick, firm step he passed out from the tent. He gathered together his bow and arrows and his many-colored blanket. He stained his body with paint and tied an eagle's feather in his hair. Then he called his dog.

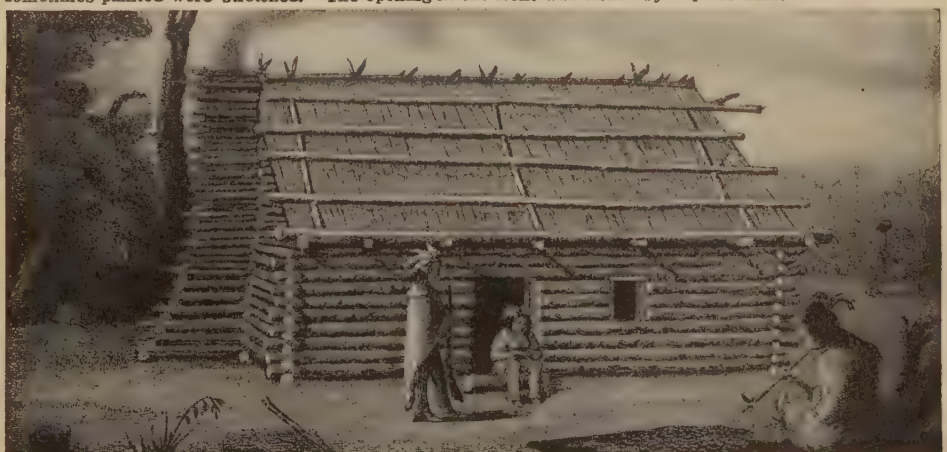
"I am going on a long journey," he told his people, a journey of many moons."

Slipping his snow-shoes on his moccasined feet, with his dog behind him, he set out over the snow, his face toward the South. Onward he traveled. Everywhere about him the land was covered by a heavy blanket of snow, and the trees crackled under the heavy burden of a thick coating of ice. No live thing was to be seen, save where here and there along the way the young Indian saw the shadow of a fox, as it slunk off into the woods, or the white signal of a cottontail rabbit as it scurried away into the distance. Presently the landscape began to change. The snow became less and less. Then it disappeared entirely. The Chippewa was in the land of Spring. The trees were all covered with little green bud tips, and the brooks had broken loose from their icy covers and

INDIAN LIFE IN THE LONG AGO

The Indian paddling his bark canoe has always been a subject for song and story. Such a canoe was used in one of our stories, and by Hiawatha, but the rude sail was seldom seen in the early days.

On pages 19 and 20 are some types of Indian houses. Here are others. This is the skin house used by the Winnebago Indians. It had a framework of wood over which skins sewn together and sometimes painted were stretched. The opening in the front was closed by flaps of skin.



This is a log cabin of the Creek Indians of Alabama sometime after the whites came. The log chimney was lined with clay. No nails were used, and the roof was held on by logs. The windows had no glass.

were singing along in the sunshine. The air became warmer and warmer, and the sunshine brighter and brighter. The Chippewa was coming to the land of singing birds, of deep blue skies and green fields filled with a tangle of wild flowers that waved in the breeze. It was the land of Summer at last.

Ahead of him the young chief saw a pathway winding up a mountainside. At the top of the mountain there stood a wigwam, and the Chippewa could see an old man sitting at the wigwam door, smoking a long pipe, from which the smoke rose in long curling wreaths toward the blue sky. As the young man drew near he could see that the Chieftain's hair was long and white, and that two keen eyes were watching him under the heavy white eyebrows.

"Father," the young man said when he reached the door, "I have come a long distance in search of my beautiful young bride. As I was sitting in the Wigwam of the Dead beside her, my heart bowed down with sorrow, I heard a voice which said that she had gone to the Happy Land of Rest. I know that I can find her if I do but travel far enough."

"Yes, my son," interrupted the old Chieftain kindly, "I have been watching for you. Come into the wigwam and rest."

When the weary traveler was refreshed the old man spoke again. "She for whom you are looking passed here but three nights back. If you will do even as I tell you, you can find her."

"Yes, yes," assented the young man eagerly. "Tell me, O father, how I can find my bride."

"This is the gateway to the Happy Land of Rest," the Chieftain said. "Leave here your body, your bow and arrow and your dog, and you can enter there."

He took the young man out on to a ledge of high rock overlooking a great grassy plain, that stretched out for many beautiful miles before them into the west.

"Go out yonder," said the old man, "and travel on until you come to a great lake of many waters. In the centre of the lake you will see a fair island. That is the 'Island of Departed Souls.' On the shore of the lake you will meet your beloved."

The Chippewa traveled on many leagues over the wonderful plain, and as he went he noticed a very odd thing. Neither trees, nor rocks, nor rivers were any obstacle to his going. The wild creatures did not run away when he came near. A tiny fawn brushed against him, and cuddled its soft chin in his palm, and did not seem afraid. The young man could not understand. Then he remembered that he had left his body behind him in the lodge. This was the Land of Souls.

By and by he came to a beautiful lake. A leafy wood reached down almost to the shore, where a narrow ribbon of gleaming sand dipped into the water. In the middle of the lake was a wonderful island, where the young man could see trees and flowers, and could hear the sweet singing of birds that flashed to and fro in the sunlight. The waters of the lake stretched blue and inviting before him. Its ripples came lap, lapping upon the silver sand at his feet. The Chippewa looked down and before him he saw a great, shining, white stone canoe drawn up on the shore, and in the canoe lay a shining paddle all ready for his hand.

The young man climbed in, and as he lifted his paddle to dip it into the gleaming water, he heard a scraping of the sand behind him. Glancing up quickly he saw another white stone canoe pushing off into the water by his side. In the canoe was his beloved, clad in her bridal garments, her dark hair divided into two shining braids that hung down over her shoulders. For a moment they looked into each other's eyes. No word passed between them. Silently, stroke for stroke they dipped their paddles into the blue water and raised them dripping as they sped over the shining lake. With one sound their canoes scraped the shores of the island. Hand in hand they wandered over the beautiful island.

At last they sat down together on the shore in silence, hand clasped in hand, happy alone in their nearness to one another. As they sat there they suddenly heard a great wind sweep through the trees over their heads, and on the wind came a voice.

"O Chippewa," the voice said clearly, "your time has not yet come to remain for ever in the Happy Land of Rest. Many summers and many winters must pass over your head before that time shall come. The Chieftain at the Lodge

will teach you many things of wisdom. Go back to your people. They are waiting for you. Teach them all that he, the Chieftain, shall instruct you. Your beloved will be waiting for you here, in the Happy Land of Rest, until you come again." The young chief looked into the maiden's eyes. "Hush," he said. "It is the voice of Manitou, the Great Spirit."

Even as he spoke, he awoke. His bow and arrows were by his side—his dog was lapping at his hand. Over him there bent the old man, the Chieftain of the Gateway of the Happy Land of Rest.

"Ah, my son, you have returned," he said. "I will instruct you that you may be the father of your people in their time of need." Many things the old man taught him, of herbs that cure all sickness, of ways to help his people. At last the young chief returned to the wigwams of his tribe, to live out his life among them. A wise and brave chief he ruled over them. And when all his days were done, he went again to join his beloved in the Happy Land of Rest, for the will of Manitou had been wrought and his rest was won. But there was great mourning among the Chippewas.

THE BRIDE OF THE FOREST

LONG ago there were many forests along the shore of the Big Sea Water. Near a grove of sacred trees an Indian village raised its wigwams. In one of the wigwams lived the chieftain with his wife and his daughter, Leelinaw. Leelinaw loved the forest, in its summer dress of green and its gorgeous raiment in the Fall. She loved it even when the birds were all silent, and it wore only a sober dress of brown covered by a snow mantle. Every day she crept away from the village and wandered in among the woods to a place where a brook bubbled over mossy stones and, breaking away from the forest, tumbled into the blue waters of the Great Lake. Here she would slip the moccasins from her slim brown feet and dip them into the sparkling water. For hours she would sit thus, dreaming, her cheek pressed against the rough bark of a tall young pine that overhung the brook. She listened to the leaves rustling and rustling—whispering to the water.

One day a great old war chief came to the village with many gifts. He wished to take Leelinaw away with him as his bride, but Leelinaw's heart was very heavy for she did not love the old chieftain.

"Let your child have one more day in the grove beside the Big Sea Water before the great war chief takes her to be his bride," Leelinaw besought her father.

"It shall be as you ask," her father told her.

The little Indian maiden fled into the forest. Her swift feet carried her to the tall pine tree that leaned over the brook. With her two arms around its rough bark, she whispered her troubles to the dear companion of her dreams. Presently through her sobs she heard a voice speaking gently in the rustling of the leaves.

"Do not weep, Leelinaw. Lean on me, for I am strong. I will take care of you. Stay here with me in the forest by the Big Sea Water. Stay with me for ever for I love you."

Leelinaw was comforted. She went back to the wigwams. To-morrow was to be her bridal day. Early the next morning before the village was stirring, Leelinaw arose. She dressed herself and slipped into the forest. When the village awoke, Leelinaw was gone. The men of the village searched everywhere for the lost girl. But they could not find Leelinaw. Sunset came and she did not return. Many days passed by and still Leelinaw could not be found. The old war chief returned to his own people without his bride. Her parents were broken-hearted.

One day they were paddling along the shores of the Big Sea Water. Suddenly on the shore where the brook dipped into the waters of the lake they saw Leelinaw watching them. Beside her stood a brave, tall and straight and slim. In his hair there waved a plume of bright green feathers. With one accord her glad parents rose up in the canoe.

"Leelinaw!" they called, "Leelinaw! Daughter, we are here!"

The girl waved her hand to them. Then she was gone. Quickly they rowed to the shore, calling, calling to her through the forest. But Leelinaw could not be seen. Two pine trees, tall and

slim, rose in the spot where she and the young brave had been standing, and only the rustling whisper of the pine needles and the echo in the forest answered to their shouts. And after a weary search the chieftain and his wife returned home.

WHY THE CHIPMUNK HAS BLACK STRIPES

ONCE upon a time long ago, the animals had tribes and chiefs like the Indians. The Porcupine was the head chief of all the tribes because nothing could ever get near enough to hurt him. One night, the Porcupine sent out word calling all the animals together for a great council of the tribes. He had a very important matter for them to consider, he said. From far and wide, from north, south, east and west, from treetops and from holes in the ground, the animals came hurrying in answer to their chieftain's summons. They built a great blazing council fire in the forest and seated themselves around it in a big ring. Then the Porcupine stood up to address them, and his quills quivered and gleamed in the firelight. For a minute or two he did not speak. He looked very much worried indeed.

"I cannot decide," he said, "I cannot decide whether we shall have night or daylight all the time."

Whereupon there ensued a great commotion. They all had something different to say. Some wanted it daytime always, and some wanted it night. They all talked at once and they all talked very loud so you could not hear what any of them were saying, except the Bear. He was rocking to and fro on his hind legs trying to drown the others out by rumbling out in a big deep voice, "Always night! Always night! Always night!"

Presently a little Chipmunk who had been sitting on the outskirts of the council became exasperated. Chipmunks always hate to sit still for any time.

"You can talk all you like," he shrilled out in his tiny squeaking voice, "you can talk all you like, but the light will come whether you want it or not. The light will come."

The other animals did not pay any attention to him but went on bawling and roaring and growling till they were hoarse, while the Chipmunk danced with excitement on the outskirts of the crowd shrieking, "The light will come! The light will come!" And lo and behold before they knew it a faint flush had crept up the sky and the golden disk of the sun rose above the treetops. Shafts of sunlight touched the tops of the trees, and fell in long beams across the open space where the council met. The fire looked weak and pale. It was daylight. An astonished silence settled down upon the gathered council of the animals. Could it be possible that it was daylight whether they wished it or not? A shrill voice suddenly piped up.

"What did I tell—"

"Grr—rr—"

The Chipmunk was gone like a flash through the trees. The Bear was after him, but the Bear was clumsy and the Chipmunk was quick so that he slipped into a hole in a tree before the Bear could catch him. As he disappeared the Bear struck at him with his paw. The black stripes that run down the Chipmunk's sides to-day show where the Bear's claws hit him long ago at the council when the animals were trying to decide whether they should have darkness or daylight all the time.

THE WHITE LILY

LONG, long ago before the white men came to North America the Indians were happy. The tribes did not go on the war path and the great chiefs smoked together the pipe of peace. Game and food of all kinds were plentiful and all the people loved one another. The days were long and very pleasant. The nights came very softly like a prayer. Each evening the Indians would gather at the doors of their wigwams and smoke. The smoke would curl gently about their heads while they talked and puffed. Each night they watched the stars come out, one after another, in the black blanket of the heaven. The Indians whispered to one another that the stars were the homes of those who had walked across the Starry Bridge of Souls.

One night the warriors stopped their

puffing — their pipes held suspended in their hands. The women gave little murmurs of fright and crouched together. A Star had left the sky and had come half way toward earth. It seemed like a flaming flower of fire.

"Awee, Awee! What can it be?" cried the old women.

That night a young braye dreamed a dream about the wonderful Star. The next day he called a council of the wise men of the village.

"Behold," he said, "I dreamed the Star of Fire we saw last night came and stood beside me in my sleep. And the Star was a maiden, white and glowing and very beautiful to look upon. 'Brother,' said the maiden, 'I have seen the red people from my seat in the sky and I love them. Ask your wise men what shape I may take that I may dwell with the people of my love forever.' "

The wise men grunted all together as the young man returned to his seat by the council fire. For a while they smoked in solemn, thoughtful silence. Then one rose who had lived in the village so many winters that no one could remember the time when he was young.

"Let the Star Maiden choose for herself," he said. "She may live in the green top of a pine tree or in the soft heart of a flower. She may stay wherever she finds rest. She is welcome to come among us. Is this not so, my brothers?"

The wise men grunted and nodded their heads slowly. "We have spoken," they murmured.

So the Star came nearer and nearer to the earth until she hid herself in a pure white rose upon the mountainside. Here she could see the red people of her love and could sometimes catch snatches of their talk. But she was very lonely, and when at evening time they stood at the doors of their wigwams her heart yearned to be among them. So one day she left the mountain rose and coming down among the people of the valley, took up her dwelling in a prairie flower. Every day great herds of buffalo went thundering by. The prairie flower swayed to the motion of their hoofs but they made the ground shake under the Star Maiden and she was frightened. She was afraid that they would trample her under their volleying hoofs. At last she could not stand it any longer.

One day the soul of the Star arose from the prairie and floated over the land, seeking a place where she might rest and yet be near the red people of her love. The Indians saw and feared that their heavenly visitor was going back to the sky. Softly the white Star floated on and on. The watching Indians lost her as she entered the softness of a fleecy cloud. By and by she came to a great blue lake. As she floated over it she saw her shadow in the water underneath, and she was pleased. Gently she sank down until she rested like a canoe upon the cool bosom of the waters.

The next morning the lake was covered with great, white, shining, star-shaped blossoms, with golden, fragrant hearts.

"The night stars have bloomed again in the water," chirruped the children, as hand clasping hand they bent over the water edge to dip their noses into the big, sweet, wonderful flowers.

"The White Star has called her sisters down to live among us," the wise men told one another, nodding their heads.

And all the people went out on the lake in their canoes and chanted songs of thanks to the beautiful floating lilies.

"Wahbegwannee," they called them, "Wahbegwannee, the white Star Flowers."

Then the winds caressed the white flowers' petals, and the birds kissed their golden hearts. Through their long slender stems fish guided their darting course, and upon their flat green leaves dragon flies sparkled like gems. The moonbeams wooed the sisters by night, but they shut up their hearts and denied them entrance for they only loved the red people.

And the heart of the Star Maiden grew full for the joys and sorrows of her loved red people were at last her own. Children, as they played on the banks of the lake, called greetings to the Star flowers. In the beautiful light of evening, young men and maidens told the lilies of their love as they drifted over the calm bosom of the water. Even the tired squaws fetched gold from the heart of the flowers, believing that its virtue would heal their sick children. And the braves sat no more around the council fire in the midst of the village, but smoked their pipes on the strand in sight of the lily pads for they said that their rest and peace would lend wisdom and brotherly love to the debate.

THE NEXT STORIES ARE ON PAGE 1145.

At the beginning of the nineteenth century, in the long struggle between the nations of Europe during the time of Napoleon, England defeated the French and Spaniards in a great sea battle, at Trafalgar, represented in this picture. Although Lord Nelson died in this battle, it was a triumphant victory for the British nation, whose ships he commanded, for this battle gave Great Britain her power at sea.

The wonderful career of Napoleon, about which we read in many parts of our book, ended at the battle of Waterloo, near Brussels, represented in this picture. Here Napoleon, having escaped from the island of Elba, where he had been exiled on his defeat by the nations of Europe, gathered his forces for a final conflict. He was again defeated by the allied troops under the Duke of Wellington, and afterwards surrendered.

WHAT THIS STORY TELLS US

THIS story brings us to the end of the history of England—yet not the end, for its history is still being made. We read here of the times that followed the Stuarts, of the coming of the House of Hanover, and of the present king. Into this part of our story come the longest reigns of English history, those of George III. and of Queen Victoria. As they were the longest they were also the most eventful. No more troubled times have been in England than those in which George III. lived; no more splendid progress has England made than under Queen Victoria. We have not been able to read in this history the full story; it has been possible only to glance through the centuries and follow events all too quickly. But in the BOOK OF MEN AND WOMEN and in our story pages we read more of the great events in the history of England and of the famous men and women whose actions have helped to make their nation great.

THE END OF A LONG STRUGGLE

THE GROWTH OF THE NATION IN MODERN TIMES

CONTINUED FROM 1043

THE times that followed the Stuarts were times of war for Great Britain, and for most of the countries, indeed, about it. When we play to-day the games of "French and English" and "The King of the Castle," marshaling our forces, storming the fort, or unwillingly giving way inch by inch, we are but recalling in the playground the spirit and action of a great struggle that lasted all through the eighteenth century, and part of the nineteenth, and was finally settled at the battle of Waterloo on June 18, 1815.

There were at least seven great wars, carried on, with short intervals of peace, in far distant parts of the world, in that long struggle. Nearly every nation in Europe joined in the fray at one time or another, and though the British met red-skinned men on the lakes of North America, dark-skinned men on the plains of India, in battle after battle, behind nearly every foe was one particular rival, their nearest neighbor, France.

This long struggle of over a hundred years was really one long, mighty duel between France and England for possession of lands in America and Asia, and the sovereignty of the seas that formed the highway to them.

It was not by accident nor by chance that those great groups of land, Canada and the West Indies, South Africa and Australia and New Zealand, came to be inhabited chiefly by English-speaking people, who still call the British Isles their home. Neither was it by accident or chance that the great and wonderful empire of India, with millions more people living in it than in Great Britain, came to depend on that small and distant country for orderly rule and government.

In the main, it was the various stages of one long duel, by the bravery and devotion of generations of soldiers and sailors, that turned Great Britain into the Greater Britain of to-day.

There were times of disaster and misfortune, when it seemed as if the final victory was to be with a Greater France, and as if Britain was to keep henceforth within the boundaries of the "Silver Sea" round the home islands, as in the days of Elizabeth.

It was not the kings of the time who in any way helped to make the empire; indeed, the four Georges chiefly hindered it. After Anne's death the crown passed away from the Stuart family, who were Roman Catholics, to a distant cousin, who ruled in Hanover, and was a Protestant. He became George I. He spoke no English, and cared little about the country he was called to rule over, so matters were left chiefly

in the hands of his very clever Ministers. The first Minister was Walpole, who managed to keep Britain at peace for many years. This rest was sorely needed, for the country was worn out with Marlborough's great wars, which had given it a place among the chief nations of Europe. During this peace George the First died and George the Second came to the throne — in 1727. Trade improved, money was made and saved, and boys had time to grow up to be soldiers and sailors, to replace those who had gone.

How a clerk became a soldier and won India

Both England and France had for many years been pushing their trade in India; they both had forts and a few soldiers to protect their interests, and very often quarreled and tried to drive each other out, and to gain power over the natives of India. Suddenly great difficulties arose, and it looked as if the English would be driven right away. Clive, who till then had been a clerk in the trading company, turned soldier. Fifteen thousand miles of sea lay between Clive and home. He had 3,000 men at Plassey in the face of 60,000, and the enemy had cannons and elephants for attack, and swift dromedaries to flee away upon. But Clive was so brilliantly clever and daring that he gained great battles over the Indians — with the French behind them — and at Arcot and Plassey laid the foundation of the Indian Empire.

Britain, as we know, had a little fringe of colonies along the Atlantic coast of North America — Virginia, New England, and the rest. France had some there, too, and also founded more along the great river St. Lawrence and the islands at its mouth. The disputes in the Old World quickly found an echo the New, and before long it was felt that either France or England must be the ruling power in America, and so war began to decide which it was to be.

A silent climb on a dark night and the taking of Quebec

It was a dark night, and the oars were muffled as the English soldiers rowed to the foot of a rocky height on which stood the French forts at Quebec. As they rowed along, the young English general repeated a beautiful poem, which many of us learn by heart, Gray's "Elegy in a Country Churchyard." It was new then, and Wolfe loved the picture of quiet life far away in England which the poem brought to mind.

"I would rather be the author of that poem," said the soldier, "than take Quebec." He did take Quebec. One holds one's breath as one reads of the noiseless climb up the steep paths, and the sudden surprize of the enemy at the top. There is a stone there now with the name of Wolfe on one side and that of Montcalm on the other; both were heroes, and died in the fight — Wolfe in the moment of victory. That was the beginning of the great Dominion of Canada.

France now began great preparations to invade Great Britain; but, as in the case of the Armada, the soldiers were never even landed, and the great fleets were scattered or destroyed. The victory of Admiral Hawke at Quiberon Bay is one of the greatest deeds of the British Navy. It was in the same year that Wolfe took Quebec.

How the obstinate rulers lost the American colonies

Of course you know the fact, which is explained fully in another place, that some of the first colonies in America along the Atlantic coast were once a part of the British Empire? We are now coming to the time of loss and trouble, when the first colonies broke away from the Mother Country, and banded themselves together under governors, without a king, as the United States of America. Great Britain had to learn a lesson.

"We will not allow the British Parliament to thrust their hands into our pockets," said the colonists. Their point was that, as Englishmen, they must control their own taxation — that is to say, the amount of the taxes must be settled by their own Parliament, elected by themselves.

The obstinate and foolish rulers in power under George the Third, who had succeeded George the Second, insisted on the taxes being fixed by the British Parliament in London, and, sooner than give way, the colonists resolved to fight. On July 4, 1776, the United States began life as a separate and independent nation, and won the great War of Independence. This birthday is still celebrated, and ever will be.

There were then about 3,000,000 people in the thirteen states of America, and thirteen stripes were marked on the flag, one stripe for each state. The flag is now made up of stars and stripes, each star standing for a state added to the Union. For mountains and rivers have been crossed, plains and valleys have been cultivated and settled, and the western boundary was ever being pushed further back till it reached the great Pacific Ocean. The 3,000,000 of people have become about 100,000,000 since then.

How the French rose against the tyranny of their rulers

But it is still an English-speaking country, and Americans love to go to the Old Country, and enjoy seeing Westminster Abbey and Shakespeare's birthplace; for both peoples have the same forefathers, and we have an equal share with them in the glories of the great past.

Some ten years after the United States became a self-governing Republic, the French rose against the oppression of their king and the nobles. Their sufferings were so bitter and so tragic that they could be borne no longer, and when once daring leaders were found, the country rose in revolution.

For weeks terrible deeds of violence were done, and all law and order were trampled upon. The king and queen and many of the nobles were put to death, and France became a Republic. It was now that a young lieutenant first distinguished himself in the French army, and rose from one success to another till he not only ruled France and its army, but almost all Europe.

The great land and sea fights of Nelson, Wellington, and Napoleon

This was Napoleon, one of the world's giants. He was a bitter foe to England, and the early years of the nineteenth century are full of amazing plans, marches, battles at sea and on land. It was a truly terrible wind-up to the long struggle between the two countries, and we read the story of the three great figures of this struggle—Nelson, Wellington, and Napoleon—in the BOOK OF MEN AND WOMEN.

"Let us be masters of the Channel for six hours," said Napoleon, "and we are masters of the world." But, brilliant as were his successes elsewhere, the "Silver Streak" was never his. The two chief heroes of these times lie in the dim quiet of the crypt of St. Paul's — Nelson and Wellington. Each may be called the hero of a hundred fights, one on sea, the other on shore. Nelson's old flag-ship still lies at anchor in Portsmouth Harbour.

It was from this ship that Nelson, at the battle of Trafalgar, gave a famous signal—"England expects that every man will do his duty." One can still stand on the spot where Nelson died, shot through the spine, saying, "Thank God, I have done my duty."

By this magnificent victory England gained full sovereignty of the seas, so that she need no longer fear invasion; her merchant ships, too, could now pass safely to and from the ports in which they traded.

Wellington's arduous work covered the next ten years. He did much to make British rule firm in India, where native armies had been trained and officered by the French to resist British power. Then he withstood France in Spain and Portugal, with hard-fought sieges and battles, retreats and defences, and throughout all these times his infinite patience never failed till his task was done, and the French were forced to take flight over the Pyrenees.

The overthrow of Napoleon and the long peace that followed

Napoleon at this time was on his way home from the terrible Russian campaign, where all had gone against him, and at last came his final defeat at Waterloo by the English and Prussians. A long peace followed, during which the old king, George the Third, died, and George the Fourth came to the throne.

Thousands of men were now thrown out of employment, and good openings were found for many to emigrate and make new homes in Australia and Cape Colony, where their countrymen had already established the beginnings of flourishing states.

The ill-feeling between Catholics and Protestants lived on in Ireland, and was the cause of much misery. By far the greater number of people in Ireland clung to the old faith, and they were bitterly persecuted by the Protestants, who made and enforced the laws. These laws were often most unjust.

For instance, no Roman Catholic could sit in the Parliament at Dublin, so that the greater part of the people had no voice in the government. Roman Catholics could not be landowners or hold any important offices, and they had to pay unjust taxes and were in every way kept down.

THE SAD STATE OF THE IRISH PEOPLE, WHO LOST THEIR PARLIAMENT

Then the British Government made most unfair rules about Irish ships and trade, which prevented the country and people thriving or making anything pay, and the Irish naturally grew more and more discontented and the country became poorer and still more wretched. Then there suddenly came a time when the Irish were listened to, and many demands were granted, especially that its Parliament should be quite independent of that of England.

Unhappily, the Irish now quarreled amongst themselves, and a great English Minister, William Pitt, carried an Act of Union, by which the Irish Parliament ceased to exist, and Ireland sent over members to the British Parliament to represent the wishes of its people.

This was at the beginning of the nineteenth century. The loss of their parliament caused a great deal of dissatisfaction among the Irish people and they have never ceased to ask for its return. After a great deal of discussion a law was passed for its restoration, and perhaps when you read this story, an Irish Parliament will again be sitting in Dublin.

Since the time of the Union, the bright red cross of St. Patrick of Ireland has been added to those of St. George and St. Andrew, thus completing the Union Jack. The national flag is the outward sign of the authority of the country; men gladly die to defend it, and under its shadow *no slave can breathe.*

THE BEGINNING OF THE LONG REIGN IN WHICH SOME OF US WERE BORN

The spirit of expansion, shown by the growth of the nation abroad, was working strongly all the time at home. The last of the Georges died, and was succeeded by William the Fourth, the sailor king, after whose short reign of seven years the throne fell to a girl of eighteen years, Princess Victoria.

The life of Queen Victoria was to be full of great and stirring events for the country, and her reign was not only the longest, but the most prosperous reign in the history of the land. Greater and greater the country grew under Queen Victoria. She was the niece of the last of the Georges. Our parents and grandparents lived in her long reign. Think for a moment of life as it was in the times of the Tudors and the Stuarts, of the wide, quiet country, small towns, leisurely journeys, and the hand-made supply of the simple wants of the people. Then, in sharp contrast, remember what we may see in our journeys to and fro, over the country of to-day. The huge towns and manufactories, the bustle and rush. The immense difference that lies between then and now was chiefly brought about in these centuries of empire-making abroad, when so many men were taken away to fight and die in distant wars.

THE GREAT GROWTH OF BRITISH POWER AT HOME AND BEYOND THE SEAS

Many seeds of future greatness had been sown in the past; in the eighteenth and nineteenth centuries we come to the time of great growth in everything, everywhere. Perhaps if we turn to Lancashire, with its great workshops, and gather the story of its great port at Liverpool, it will help us to realize how some of the great changes came about. In Queen Elizabeth's time, it was a poor little town begging for money to pay its way.

After the Great Plague and Fire of London, many merchants were obliged to leave the capital, and went to trade at Liverpool, with ports on the Irish Sea, and beyond the Atlantic to the West Indies. Then a great canal, called the Duke of Bridgewater's canal, was dug, connecting Liverpool with the new towns rising up in South Lancashire, for the coal trade was growing, and the invention of spinning machinery, together with the use of steam-engines, all gave the ship-owners plenty to do in bringing raw cotton across the Atlantic.

The first steamship from America appeared in the Mersey four years after Waterloo was fought. The excitement of the people watching its arrival was very great. A few years later the railway was opened between Liverpool and Manchester, and a few

THE BEGINNING OF THE LONGEST REIGN

This picture represents the beginning of the longest and most prosperous reign in the history of England—the reign of Queen Victoria. When King William died at Windsor, in 1837, two mounted messengers rode through the night to Kensington Palace. They found Princess Victoria asleep, and this girl of eighteen was awakened about five o'clock in the morning to be told that she was Queen of England. This picture, painted by H. T. Wells, R.A., and now hanging in the Tate Gallery, London, shows the young queen at this great moment of her life. She reigned for over sixty years.

By permission of the Fine Art Society, the owners of the copyright.

years after the iron rails extended to London. There are still people in small country districts who have never been in a train, and their doubts and fears bring home to us what the feelings of the first passengers in the first trains must have been as they started on the new system of traveling.

THE GREAT TOWNS THAT GREW UP IN THE VICTORIAN TIMES

All the time trade went on growing, the river was dredged and deepened, miles of docks were built along the banks, a tunnel was made under the river-bed, and a million people found work in the great city, which is to-day full of fine buildings, houses, and shops. The water they use comes many miles in pipes, from a lake in Wales.

The story of the growth of Glasgow, Manchester, or Belfast is just as interesting and wonderful; so is that of all the great ports and towns near coal-fields. As for London, the second largest city in the world, though it early passed beyond the old city walls and gates, in Queen Elizabeth's time, there were still country houses with beautiful gardens at Blackfriars, and the villages of Kensington, Islington, and Hackney were more difficult to reach than Brighton or Tunbridge Wells are now. To-day all these villages, and many more, are part of the greater London, and roads are still stretching out, like long arms, to gather in villages and towns yet farther afield.

Long years of peace abroad gave England time to set her affairs in order and to progress at home. But unhappily she was dragged into a war in the middle of the nineteenth century with Russia.

A TERRIBLE MISTAKE IN A TERRIBLE WAR OF MISTAKES

We have often seen in this country's story French and English fighting on opposite sides, but now they were fighting side by side, on a little peninsula called the Crimea, on the north of the Black Sea. Both were afraid that Russia would become too powerful if it did as it wished to its neighbor—Turkey; so they backed the weaker power.

It was, indeed, a grievous war. After forty years' peace men seemed to have forgotten how to arrange and plan campaigns, and everything was so mismanaged that the poor soldiers had neither proper clothes nor boots, food nor arms. The bitter weather and the miseries they had to endure made many of them very ill, and the great wards of the hospitals were full of men brought in only to die. To this scene of suffering came Florence Nightingale, whose story we read on page 569.

On another page in this book is the poem about the Charge of the Light Brigade, "The noble six hundred." This charge was made owing to a mistake, in this war of mistakes.

"It is magnificent," said a French officer who saw the charge, "but it is not war." Six hundred and seven gallant soldiers obeyed the order to charge, through an awful lane of shot and shell, at the Russian guns, with the whole Russian army behind them; and only 198 men returned.

Towards the end of this war, Sebastopol fell after a siege which had lasted a year. England went nearly mad with joy when peace was proclaimed, and people hung out flags, put lights in their windows, went in processions, and lit bonfires on the hill-tops and in the open spaces, as the country had done on the defeat of the Armada.

THE DARK DAYS THAT FELL UPON INDIA

Englishmen had also terrible days to face in the Far East in the "fifties" of last century. For a time it seemed as if the whole great empire of India, which had been growing all through the hundred years since Clive laid its foundations, were to collapse and be entirely lost to them. Numbers of English men, women, and children lived in different parts of India then, and the army consisted of a few British soldiers, and great numbers of native soldiers called Sepoys.

Suddenly the Sepoys rose in rebellion, shot their officers, seized the prisons, and murdered all the white people they could. One of the reasons given for their bitter rage and anger was that a report had been spread that they were all to be forced to give up their religion, and to do things forbidden by their sacred customs. The spirit of cruel destruction spread like a prairie fire; there was no stopping it. A white marble angel, holding a palm branch, stands now in Cawnpore.

It marks the spot where about five hundred British women and children were killed in the Mutiny.

THE JOY THE BAGPIPES BROUGHT TO THE CITY OF LUCKNOW

The siege of Lucknow was another event of this terrible time. For many months the British were shut up there, enduring the heat and great sufferings from wounds, sickness, and terror. The brave General Havelock—whose statue stands near Nelson's column at Charing Cross, came to their relief when things looked hopeless. Try to imagine the joy and thanksgiving when, in the distance, was faintly heard the music of the bagpipes playing the familiar home tunes of "The Campbells are Coming," "MacGregor's March," and "Auld Lang Syne." The people and town could not believe the Highlanders were really there.

Two months later the dreadful Mutiny came to a peaceful end. Some of the Indian regiments, and especially the Sikhs, are among the best soldiers of the empire now. Englishmen learnt many lessons from this great rising—one of them being that, though there may be many things that need altering in India, the people must be led forward, not dragged, towards a better life.

In England great changes were taking place; one of the first changes in Victoria's reign was the introduction of the penny post. People are so used to it now that it is difficult for them to imagine paying perhaps 50 cents to send a letter.

THE BEGINNING OF CHEAP LETTERS AND TELEGRAMS

When Rowland Hill first proposed the scheme it was looked upon as a joke; but in the end it got through, and it has been an enormous success. About the same time how to send messages by telegraph was discovered, and the lines and poles were fixed up by the side of the railways. Soon the difficulties of sending the flashing message from one side of the ocean to the other were overcome, and cables were laid to the most distant parts of the earth. Even more wonderful is the sending of wireless messages, as is now done. This power of getting rapid messages, and of traveling quickly in fast steamers and trains, draws the distant peoples of the earth closer together.

But another sort of growth was going steadily, slowly on through the eighteenth and nineteenth centuries—a kind of progress more important than adding land to the empire, than getting more trade, more people, more money in the country. It was the progress we call Reform—the feeling that makes men see what is wrong, and then determine to set the wrong right.

There is a faded old manuscript in the British Museum, of the Gospels, with notes on the margin. Those notes are records of the setting free of slaves in the times of the Anglo-Saxons. The prayer was said at the altar, the collar and fetters of iron struck off by the smith, the weapon of the free put into the eager hands. Some of these slaves were captives taken in war. Some could not pay the fines imposed on them for wrong-doing, some had sold themselves to get food.

THE THINGS THAT ENGLAND BECAME ASHAMED OF AND SWEPT AWAY

After long years, actual slavery was done away with, but the poorest in the land lived miserable, uncared-for lives on the farms, and for centuries people seemed to take it for granted that there must always be some rich and comfortable people at the head of society, and masses of ignorant and poor people at the bottom. But all through the last centuries this idea has been slowly dying. People believe now that all have a right to be taught what is good and true, and to have the best that is in them drawn out and trained and strengthened, so that they may worthily fill their place in this beautiful world. It is now a disgrace for anyone to grow up ignorant, and great efforts are made to provide the best schools, to start public libraries, museums, picture galleries, and cheap books.

For years the country has been growing more and more ashamed of bad and unhealthy houses, and of paying people too little for their work, making them work too long, and in other ways oppressing the poor and the weak.

The names of many great Reformers, whose stories we read in another part of this book, stand out in these centuries. Some of them, by unwearied effort, put an end to the wicked slave

trade in the colonies, to the wretched state of the prisons, and never rested till cruel laws and punishments were done away with. Others worked hard for good education and to make just laws about employment. Others sought to bring the government of the country nearer to the real feeling of the people.

We have seen all through this country's story the struggle it has been to prevent the kings trying to rule as they pleased, and the hard fight that Parliament has had to keep its rights. Until last century only well-to-do people could vote for the members of Parliament, which was most unfair, as the thousands who had no vote had no voice in the making of the laws that they had to obey, or the making or spending of the taxes they had to pay. Step by step, more and more people have gained the right to share the government, and slowly great rights have been won, the right to think and worship as one pleases, to speak at public meetings, to write in newspapers.

SOME OF THE MEN WHO HAVE HELPED TO MAKE THE NATION GREAT

Let us, in our fancy, walk together once more in Westminster Abbey, where there are so many memorials of men who have helped in the growth of the country. Entering at the west door, we find the figure of Lord Shaftesbury, the "Children's Friend," who never rested till laws were passed forbidding poor little boys to climb up hot, dark, rough chimneys to sweep them. He it was who put an end to children working in mines, and who did so much for ragged schools. Pitt, the great statesman, stands near by, with his arm stretched out in defiance of the enemies of Britain who were closing round her, against whom he planned so ably. Fox, the "Man of the People," is represented with a thankful negro at his feet, rejoicing in the liberty Fox helped to gain. We find the names of Peabody, who did much for better housing; Livingstone, the hero of Africa; Stephenson, the great engineer; Sir Isaac Newton, who discovered why an apple falls from the tree. On one side of the choir is the medallion portrait of the two brothers Charles and John Wesley, whose beautiful hymns still echo, Sunday after Sunday, the teaching which had such a great influence among the people in the eighteenth century.

No single story of England can tell us of all the great men who have lived and worked and died to make the nation great; nor can any single story tell of all the great events that helped to make the power of England in the world.

THE SPREAD OF HAPPINESS AND GOODWILL AMONG THE PEOPLE

The twentieth century opened more prosperously in England than any other since the Romans brought civilization there, and it lies with those now living to make the country happier still for those who are to come. The Victorian Era, in which freedom and learning and power were spread widely among the people, came to an end in 1901, when Queen Victoria died. Her long reign, which, on the whole, was chiefly a reign of peace, ended amid a terrible war against the Boer people in South Africa.

THE DOMINIONS WITHIN THE EMPIRE

This war came to an end in 1901. The Transvaal, as the country of the Boers was called, was made part of the British possessions, and in 1909 all South Africa, including the Cape of Good Hope, Natal, the Transvaal, and the Orange Free State, became united under a responsible government. The Union of South Africa has a governor-general sent out by the king, and General Louis Botha, the great Boer general, was made the first prime minister.

The colonies in Australia and Tasmania had united in 1901, and New Zealand was made a dominion in 1907, so that there are now four great dominions incorporated into the British Empire.

Queen Victoria was succeeded by her son, King Edward VII., who did so much to make the empire friendly with other nations that he was called the "peacemaker." He died in 1910, and his son, King George V., the present ruler, ascended the throne. Since his reign began a great many laws have been made for the benefit of poor people in the British Isles. Any poor person, who lives to be seventy years old, can get a pension, and there are laws by which poor people are taken care of when they are sick, and while they are unable to work their families are supported.

THE NEXT STORY OF COUNTRIES BEGINS ON PAGE 1367.

WHAT THIS STORY TELLS US

NO man knows what life really is; no man can say what it is that makes a bird fly in the sky, a beetle crawl on the ground, a fish swim in the sea, a man walk along the street. No man knows what is the wonderful thing that is in our bodies when we are born and goes out of our bodies when we die. For thousands of years men have wondered about life, and we are learning to understand it more and more. We know now *where* life is—that is to say, we know exactly where life can be stopped by the prick of a pin. We have read already about the wonderful cells which do all the work of life, and here we learn of the very heart or centre of these cells, where life really is. We call this home of life the *nucleus*, and this story is the story of the nucleus.

WHERE LIFE REALLY IS

CONTINUED FROM 1021

NOW let us look more closely at the amœba, and see whether we can find different parts in it. Is it just a round speck with no features; or has it different parts, just as our bodies have different parts? The answer to this is that the amœba has two parts, and that this is the general rule with all living cells.

Somewhere about the centre of the amœba, this tiny speck, there is a still tinier speck, which is not an accident, but is found in all amœbas. It looks a little denser than the rest of the amœba, doubtless because it has not quite so much water in it. All life, we must remember, is lived in water, and the amœba, like our own bodies, is quite three-fourths water.

But it is the outer part of the amœba that is most watery. The little speck in the centre is more solid; it has a special and very important name—important because this little speck of living stuff is typical of the living cell. It is called the nucleus, which is from the Latin word for a nut, which is *nux*, and means simply the kernel. This is a very good name, for the kernel of a nut is the real part of it; the rest exists for the sake of the kernel. And, just as the cell-wall is not the real cell, so the outer part of the cell itself is not the real cell. The most real part of the cell, as we shall soon see, is the nucleus, which is the very abode of life. But we may first of all say a word or two as to the rest of the cell, which is of far less importance.

In the case of the amœba and many other cells, the outside part of the cell is rather like our bodies as compared with our brains. It is by movements of the outer part of the cell that the cell moves. So we may say that it serves the cell for legs. Then, of course, the amœba has to take in its oxygen through the outer part of the cell, which thus serves it for nose and lungs. Remember that every living cell in our own bodies is also breathing in the same way. A special word may be said as to the way in which the outer part of the amœba acts as mouth and stomach.

Like every other living creature, the amœba has to feed. No living thing can make its life and movement out of nothing. The amœba has no hands, no mouth, and certainly no knife and fork, but it has to get food into its body somehow, just as we have to. When it meets a tiny speck of something it can eat, it slowly throws out from itself two little projections, one on each side of the speck of food. These gradually enwrap or flow round it, until at last it is enclosed inside the body of the amœba—that is to say, inside the cell. The pictures show us exactly what the amœba looks like when it is taking a meal, and how it

makes arms and mouth for itself. Then, just as we have to digest our food, the amœba has to digest its food; and so the outer part of the amœba, or, rather, the whole amœba except for the speck in its centre, may play the part of a stomach. Whatever the amœba eats has to be digested outside the nucleus. You never find a speck of food inside the nucleus, any more than you would find a mouthful of milk inside the brain.

THE NUCLEUS IS REALLY THE BRAIN AND THE MASTER OF THE CELL

All the work of digestion and preparing has to be done outside the nucleus. The nucleus is the master, and all the work has to be done outside it and for it, so to speak; just as in ourselves the brain is the master.

When we come to look at the white cells of our own blood, we see that they are able to pick up and carry away particles of smoke that we have breathed into our lungs, and that they are even able to catch and kill microbes and other living cells which might hurt us. But you will never find a speck of coal-dust or a microbe inside the nucleus of a white blood-cell, unless the cell is killed by the microbe and falling to pieces. In all this I am trying to make you understand as clearly and completely as can be that the nucleus is not merely a dense speck inside the cell, but that it is the brain of the cell, and that all the rest of the cell, though it may take up twenty times as much space as the nucleus, really exists for the nucleus, just as the shell exists for the kernel of a nut.

WHAT THE CELL ITSELF LOOKS LIKE UNDER THE MICROSCOPE

If we look at the cell apart from the nucleus, we are very uncertain as to how it is made. It is certainly not transparent, though it lets a good deal of light through it; it looks rather like a half-transparent jelly. Indeed, if you can imagine a jelly that looked like ground glass, that would be very much what the body of a cell looks like. Some people have thought that a better description of it would be that it looks as if it were made of tiny bubbles, like foam. But if you remember that we are looking at a very delicate and living thing, and that we usually have to do all sorts of things to it before we can look at it under the microscope, you will perhaps understand why it is that we are not agreed as to what the structure of the cell-body is. Fortunately, we know far more about the structure of the nucleus, which is a thousand times more important.

Now, not only is the nucleus the essential part of the cell, but the life of the body of the cell depends upon the nucleus. If one of your fingers were cut off, it would die; your finger is alive, but it cannot live by itself. In the same way, if we cut off any part of the body of a cell from the rest of the cell, it will die; or, to put it another way, if you cut a cell into two parts, one of them containing the nucleus and the other not, then the part which contains the nucleus will go on living, will mend itself, will recover its former shape. But the part which does not contain the nucleus will die. This always happens; no exception to it is known anywhere. It is true of the amœba, but if we take the case of a cell more unlike the amœba than anything else we know we find that the same is true.

THE WONDERFUL LIKENESS BETWEEN THE AMŒBA'S CELL OF LIFE AND YOURS

The nerve-cells in our bodies are at first very like the amœba, but when they are fully formed they are vastly different. Like the amœba, they have a nucleus. But the cell-body is prolonged in one or more directions in the form of a long thread, which is what we call a nerve. That thread is really part of the cell-body of the nerve-cell from which it springs. So if you were to cut a nerve across, the experiment would really be the same as the experiment of cutting the amœba into two pieces, one containing the nucleus and the other not; and the result is the same in both these different cases.

The part of the nerve still in connection with the nucleus remains alive and unchanged, but the other part of the nerve, on the far side from where the cut was made, dies. It seems to me very wonderful indeed that it should be possible to take such a cell as this tiny amœba of the ponds, on the one hand, and one of the nerve-cells in the human brain, on the other hand, and to prove that, in spite of the measureless difference between these two cells, yet the laws of their lives are one and the same. The laws of any life are the laws of all life, however vast the difference may be

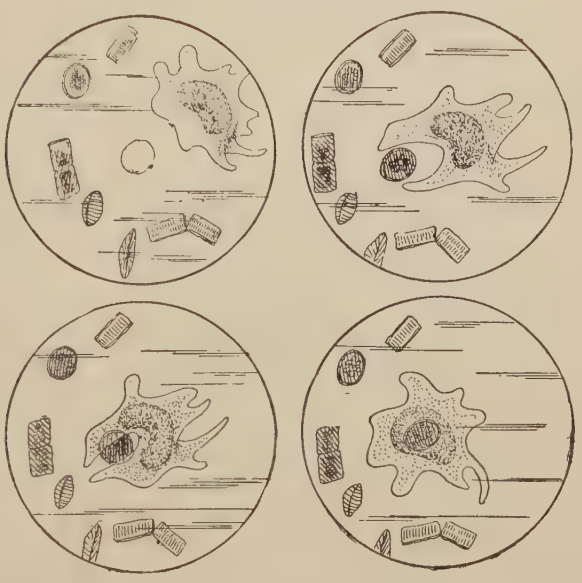
between one kind of living creature and another. If, after an accident, where a nerve has been cut, a clever surgeon sews the two cut ends of the nerve together, then, through the power of the nucleus, which may be two or three feet away, as in the case of the nerves of our legs, new living nerve matter will grow down from the cut place into the sheath of the old nerve, and take its place again; just as the piece of the amœba that contained the nucleus soon grows into a whole amœba.

The nucleus, then, is the centre of the life of the cell; apart from the nucleus the body of the cell cannot live. The cell's power of repairing damage depends entirely upon the nucleus.

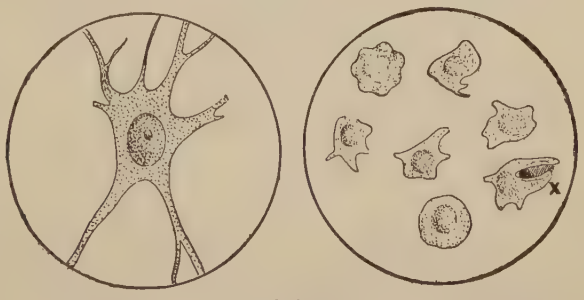
Furthermore, we have learned lately that the character of the cell depends upon the nucleus. Boys and girls differ in character, as we know; though their bodies are very much alike, their brains are very different. Probably all cell-bodies are made of very much the same stuff—arranged, if it is arranged at all, in very much the same way; but it is the nucleus of one kind of cell that differs from that of another, and so gives the cell its character.

Though the body of a cell cannot live without its nucleus, yet the body of the cell is truly alive, and will live —for a very short time—even when separated from the nucleus. The stuff, then, of which the body of the cell is made, and the stuff of which the nucleus is made, is living stuff, and, as we are beginning to understand that all life is really the same, we shall not find it difficult to believe that all living matter, wherever it is found, whether in a lily or in a fish or in a man, has certain common properties which make it different from matter that is not alive. This is certainly so; and we must clearly understand the wonderful stuff which we may call living matter, or, at any rate, matter in which life exists. The name for this particular kind of matter in which all life lives is so important that, though it is a rather long name, I must tell it to you; it is *protoplasm*. The word really means the first building-stuff. All the life that we know is lived in protoplasm, and the living part of all living cells is made of protoplasm, both the cell-body and the nucleus.

HOW THE AMŒBA TAKES A MEAL WITHOUT HANDS OR MOUTH



Like every other living creature, the amœba has to feed, and these pictures show us how the amœba, the humblest living creature on the earth, finds its food and eats it without either hands or mouth. When it meets a tiny speck of something it can eat, it throws out two little pieces from itself, one on each side of the speck of food, and these gradually enclose the speck until it is imprisoned in the body of the amœba, as in the third picture.



The life in all kinds of cells is similar, and every cell has a nucleus, without which it cannot live. The first of these pictures shows a nerve-cell in our bodies; the second shows amœba-cells, each one with a nucleus in every essential way like a nerve-cell. One of the cells in the second picture is making a meal off a microbe.

THE NEXT PART OF THIS IS ON PAGE 1195.

THE WONDER OF THE SEASONS

These pictures show the magic of the seasons, the wonderful way in which the world changes through the year. The face of the world is always changing, and we see it clearly in these pictures of a country-garden. The top picture shows it in spring, the second in summer, the third in autumn, and the fourth in winter.

JOHN BUNYAN'S GREATEST WORK

NO book, except the Bible itself, has had greater influence for good on the minds of men than "The Pilgrim's Progress." Written in simple, straightforward English, by a plain, straightforward man, who, from being a poor tinker, became a powerful preacher of God's message to mankind, this immortal story is likely to be read as long as our literature endures. The story is told as an allegory, illustrating the trials that beset a Christian on his way through life, but it is better than most allegories, because the characters are so human that we are instantly interested in each for his own sake, as well as anxious to know what happened to them all. John Bunyan, the author, was born at Elstow, near Bedford, in 1628, and died in London in 1688. He was imprisoned for twelve years for daring to preach the Gospel without the sanction of the Church, and while in Bedford prison he wrote the first part of his immortal story, which is here retold largely in his own words.

THE PILGRIM'S PROGRESS

CHRISTIAN'S BURDEN FALLS FROM HIS SHOULDERS

CONTINUED FROM 972

AS I walked through the wilderness of this world I lighted on a certain place where was a Den, and I laid me down in that place to sleep, and as I slept I dreamed a dream.

I dreamed, and behold I saw a man clothed in rags, standing in a certain place, with his face from his own house, a book in his hand, and a great burden upon his back. I looked, and saw him open the book and read therein; and as he read he wept and trembled, and at length brake out with a lamentable cry, saying: "What shall I do?"

In this plight he went home and told his wife that he was informed that their city would be burnt with fire from heaven, in which fearful overthrow he and his wife, and his sweet babes would miserably come to ruin, except some way of escape could be found. His relations tried, without avail, to rid him of his fears.

Now, I saw upon a time when Christian—for this was the man's name—was walking in the fields that he was reading in his book; and as he read he burst out as before, crying: "What shall I do to be saved?" I looked then and saw a man named Evangelist coming to him, who asked: "Wherefore dost thou cry?"

When he had answered, Evangelist said: "If this be thy condition, why standest thou still?"

"Because I know not whither to go," he answered.

Then Evangelist gave him a parchment roll, and there was written thereon: "Flee from the wrath to come." The man read it, and, looking upon Evangelist carefully, said: "Whither must I fly?"

Then said Evangelist, pointing with his finger over a very wide field: "Do you see yonder wicket-gate?" The man said: "No." Then said the other: "Do you see yonder shining light?" He said: "I think I do." Then said Evangelist: "Keep that light in your eye and go up directly thereto, so shalt thou see the gate, at which, when thou knockest, it shall be told thee what thou shalt do."

So I saw in my dream that the man began to run. Now, he had not run far from his own door, but his wife and children and neighbors, perceiving it, cried out to him to return. But the man ran towards the middle of the plain.

Two of his neighbors, Obstinate and Pliable, resolved to fetch him back by force. When they came up with him, he told them that if they died in the City of Destruction, where he and they were born, they would sink lower than the grave.

They talked together, and Christian asked them to read in his book.

"I saw a man clothed with rags, a book in his hand, and a burden on his back. As he read, he wept and trembled, saying, 'What shall I do?'"

Obstinate cried: "Away with your book! Will you go back with us or no?"

"No, not I," said Christian, "because I have laid my hand to the plough."

Obstinate then went back, but Pliable offered to go with Christian, and even urged him to mend his pace, when he heard further what the things were and how to be enjoyed whither they were going. But Christian had a burden on his back, and Pliable was unencumbered.

Now, I saw in my dream that, just as they had ended this talk, they drew very near to a very miry slough, and, being heedless, they did both fall suddenly into the bog. The name of the slough was Despond. And Christian, because of the burden that was on his back, began to sink in the mire. Then said Pliable: "Ah, neighbor Christian, where are you now?"

"Truly," said Christian, "I do not know."

At this Pliable began to be offended, and angrily said to his fellow: "Is this the happiness of which you have told me all this while? May I get out again with my life, you shall possess your brave country alone for me." And with that he gave a desperate struggle and got out of the mire on that side of the slough which was next to his own house, and Christian saw him no more.

Christian, left to tumble in the Slough of Despond alone, endeavored to struggle to that side that was next to the wicket-gate; which he did, but could not get out, because of the burden that was upon his back. But I beheld in my dream that a man came to him whose name was Hope, and set him upon sound ground.

Now, as Christian was walking along by himself, he was met by Mr. Worldly Wiseman, who advized him that he could get rid of his burden much more easily by applying to one Legality, whose

Pliable, who became afraid, and deserted Christian.

house was on a high hill which he pointed out. So Christian turned out of his way to go to Mr. Legality's house for help, but when he got hard by the hill it seemed so high, and that side of it which was next the wayside did hang so much over, that Christian was afraid to venture further. His burden seemed heavier, and flashes of fire came out of the hill that made Christian afraid that he should be burnt.

In this way he was found by Evangelist, and once more set on the right path; and so in process of time he got up to the wicket-gate. The gate was opened to him by Goodwill, who, after hearing his story, asked him to look before him at a narrow way.

"That," said Goodwill, "is the way thou must go."

"But," said Christian, "are there no turnings or windings, by which a stranger may lose his way?" "Yes," said the other, "there are many ways butt down on this, and they are crooked and wide. But thus thou mayest know the right from the wrong, the right only being straight and narrow."

Early in the journey they fell into the Slough of Despond. Pliable got out on the side nearest home, but Christian struggled to the other side.

Obstinate, who tried to bring Christian back.

Then Christian went on till he came to the house of the Interpreter. After he had knocked, as he had been told to do by Goodwill, and the door had been opened, I saw in my dream that the Interpreter took him by the hand, and, leading him within, showed him a picture of the man whom the Lord of the place whither he was going had authorized to be his guide, and other excellent things such as would be a help to him in his journey. When the Interpreter had given him his blessing, Christian went on his way, pondering on the things that had been shown to him.

Now, I saw that the highway up which he had to go was fenced on either side with a wall, called Salvation. Up this way, therefore, did burdened Christian

Christian had much profitable discourse in the Palace Beautiful

run, but not without great difficulty, because of the load on his back. He ran till he came at a place somewhat ascending, and upon that place stood a cross, and a little below, in the bottom, a sepulchre. So I saw in my dream, just as Christian came up with the cross, his burden loosed from off his shoulders, and fell from off his back, and began to tumble, and so continued to do till it came to the mouth of the sepulchre, when it fell in, and I saw it no more.

Then was Christian glad and lightsome, and stood awhile to look and wonder, till the springs that were in his head sent the water down his cheeks. As he stood looking and weeping for gladness, behold three Shining Ones came to him and saluted him with: "Peace be to thee." The first said to him: "Thy sins be forgiven thee"; the second stripped him of his rags, and clothed him with change of raiment; the third also set a mark on his forehead, and gave him a roll with a seal upon it, bidding him look on it as he ran, and that he should give it in at the Celestial Gate. So they went their way, and Christian gave three leaps for joy and went on singing.

CHRISTIAN'S FIGHT WITH APOLLYON

THE COMBAT IN THE VALLEY OF HUMILIATION

WHILE resting on the hill called Difficulty, Christian fell into a deep sleep. And as he slept his roll dropped from his hand. At the summit of the hill he met two men, named Timorous and Mistrust. They said they were returning, because the farther they went the more dangers they met with.

This caused Christian to feel in his bosom for his roll, that he might read therein and be comforted. But, finding it not, he went down the hill again to the arbor, where he had slept. Who can tell how joyful this man was when he had gotten his roll again, which was to be his pass into the Celestial City? How nimbly did he now go up the hill! But before he got up, the sun went down upon him, and he thought of the lions in the way, of which Timorous and Mistrust had told him. But while he was blaming himself for sleeping, he lifted up his eyes and saw before him a stately palace, the name of which was Beautiful. So he made haste that, if possible, he might get lodging there.

Before he had gone far he entered a very narrow passage, about a furlong off the porter's lodge, and espied two lions in the way. The lions were chained, but he saw not the chains, and was afraid. But the porter, whose name was Watchful, called out to him to keep in the midst of the path, if his faith was strong enough. This Christian did, and so entered the Palace Beautiful,

which was built for the relief and security of pilgrims.

There came forth to meet him a beautiful damsel called Discretion, who, on learning his story, called out Piety, Prudence, and Charity. Thus was Christian welcomed into the house.

Here he had much profitable discourse, such as he had had at the Interpreter's house. After supper, Christian was given a large upper chamber, whose window opened toward the sun-rising, and here he slept till the break of day.

Before he left this place, the rarities of which were shown to him, he was taken up on to the roof, whence he beheld at a great distance a most pleasant mountainous country. The mountains were the Delectable Mountains, and the country was Emmanuel's Land, from which he was told he could see the gate of the Celestial City.

Christian was now anxious to be setting forward, but before letting him go his hosts took him into the armory, where they harnessed him from head to foot, except upon his back, with what was proof against attack, lest perhaps he should meet with assaults on the way. At the gate he learnt from the porter that one Faithful, a fellow-townsman, had passed that way.

TIMOROUS

MISTRUST

On the Hill Difficulty, Christian met Timorous and Mistrust, who were coming back because the dangers that lay ahead made them lose heart.

Then he began to go forward, but Discretion, Piety, Charity, and Prudence accompanied him to the foot of the hill, which led to the Valley of Humiliation. Christian went down very warily, for the hill was dangerous, yet he had a slip or two. When all were at the foot of the hill, his good companions gave Christian a loaf of bread, a bottle of wine, and a cluster of raisins; and then he went on his way.

But poor Christian had gone only a little way in the valley before he espied a foul fiend, hideous to behold, coming to meet him.

The name of the fiend was Apollyon. Christian was at first afraid, and began to cast in his mind whether to go back or stand his ground. But as he had no armor on his back, he thought that to turn might give the enemy the greater advantage to pierce him with his darts. So he went on, and Apollyon, when he refused to go back, straddled quite over the way, and hurled a flaming dart at Christian's breast. Thus began a sore combat that lasted for over half a day.

When Christian had been wounded in head, hand, and foot, and was almost spent, Apollyon came to close quarters, and, wrestling with him, gave him a dreadful fall, so that his sword flew out of his hand. Then said Apollyon: "I am sure of thee now." And with that he almost pressed him to death. But while Apollyon was fetching of his last blow, Christian nimbly stretched out his hand and, regaining his sword, gave the fiend such a thrust that he spread his dragon's wings, and sped him away. Then there came to Christian a hand with some of the leaves of the Tree of Life, which Christian took, and applied to the wounds which he had received, and was healed immediately. He also sat down, and, after being refreshed, resumed his journey.

Christian carried his drawn sword in his hand this time, but he met with no other affront in this valley.

THE NEXT STORIES FROM "THE PILGRIM'S PROGRESS" ARE ON PAGE 1181.

REAPING THE GREAT WHEATFIELDS OF OREGON

In Umatilla County, Oregon, are some immense wheatfields. This picture made near Pendleton, shows a close view of the great combination reaping and threshing machines at work. They cut the grain, thresh it, and fill the sacks ready for market. If you look closely you will see the sacks on a shelf near the front of two of the machines. Some machines require thirty horses or mules to draw them. Notice the position of the driver, who is perched on a seat ahead of the machines.

THE WORLD'S BREAD & BUTTER

CONTINUED FROM 1094

ONCE, when the people of France had long been badly governed by selfish kings, it was reported at the Court that the people were dying for want of bread.

"Dear me, how stupid of them!" said a great lady. "How very stupid of them! Why don't they eat cake?" That showed her to be as stupid as she thought the people were. If they had had flour with which to make cake, could they not have made bread, which is cheaper and more necessary for food?

All civilized people need bread. It is the commonest food; it is the cheapest—but it is the one food which rich and poor alike must have. We tire of almost every sort of food except bread and butter. We grow tired of cakes and biscuits and pastry, but not of bread. When travelers return to America after long journeys in wild countries, where, if they get bread at all, it is of very poor quality, the thing they are most glad to have is good white home-made bread.

Many things will make bread, and there are many ways of making it; but the best bread in the world is that which we get in the country cottage, far away from the town bakery. It seems simple enough to make bread, yet, though the village woman knows nothing about science, the manner of making it properly depends entirely upon science.

First of all, we must have the flour. That is made from wheat. The wheat is ground at the mill. The brown husk which forms the covering of the grain of wheat is taken away, and pure white flour remains. Those husks make bran, which rabbits and horses like. If the bran is not taken away, the flour with it in makes brown bread. That is called whole wheat bread, because no part of the grain is removed. The difference between the white flour and the whole flour is that from the whole flour you do not get so light and spongy a loaf as from the white.

The reason for this is that the yeast or leaven, which is used in making bread, cannot work so well in the whole flour as in the white flour. The yeast, when put into the dough, causes carbonic acid gas to form, and to force its way all through the dough. The gas is trying to escape into the air, but the dough made by the white flour and water sticks so fast together that it will not let the gas go forth. Instead, it lets the gas force it into holes and bubbles. Then, when it is baked, these holes keep the bread light and spongy. With the whole flour the bran does not cling so tightly together as the dough made from the white flour. Therefore it lets the carbon dioxide escape. It contains, however, all the food value of the wheat. In white flour some of this is lost.

Sometimes we find old-fashioned ovens in which they bake bread to-day just as they baked it hundreds of years ago. They put wood into the oven and set it alight, and keep it burning there until the oven has been made hot enough. Then the oven is swept out, and the dough put in to make bread while there is still enough heat in the oven to do so.

That is the way in which they used to bake the bread in Pompeii, the city which was buried by a volcano, of which we read on page 88. Ovens have been found there with the burnt embers in them, just as they were made ready for baking on that terrible day when the boiling mountain threw up its ashes and buried the city under them.

In the same way hunters in the forest cook their food. They make a hole in the ground and put a fire in it, then, clearing out the ashes, they put in meat, cover it over with earth, and let it cook in the heated pit where the wood has burnt.

Scotch oatcakes are made from oats roughly ground between two stones. In that way the Israelites made their bread when following Moses through the wilderness. It was unleavened, as are the Scotch oatcakes to-day. In the same way Indians, and the people of Afghanistan, make their bread still. In parts of the world where millet—the seed on which we feed doves and other birds—is more commonly grown than wheat, the people make good bread with it, but it is dry and brittle.

Poor people in some European countries, who cannot afford to buy wheat, make their bread of rye or barley. They do not mind eating it, as they have never known any other sort; but to us it tastes sour, and looks very black. In our country, meal made from Indian corn is also used for bread. Rice also is used. None of these breads is so good as bread made from wheat, though some people like them quite as well. There is nothing else quite so good as wheat, the most wonderful grain in the world.

While in our own homes we have many varieties of bread and different cereals, had you lived among our native Indians fifty years ago, corn bread would have been the only kind you would have to eat, unless you had happened to be with those who had settled down in fixed homes.

But if we have bread on the tea-table there must be butter on it too. How is that to be had? A glass of milk does not seem much like butter for use with bread, but the butter is in the milk.

The milk is full of the tiniest parcels of fat. The fat is not floating about in a mass in the milk. It is in a great many tiny globules, and each globule is neatly packed up in the tiniest, thinnest skin or membrane.

When the milk is churned it is so violently knocked about that the tiny skins holding the fat break. The fat floats out, and the churning causes all the little drops of fat to become joined together. That mass of fat, after proper treatment, becomes the butter that we eat.

In some parts of Europe people do not like butter as food. They make it and use it as an ointment, but take olive oil instead of butter for food. Long ago all the people who had butter used it as ointment.

It is supposed that the Arabs first learned how to make butter. They put milk into skins, and carried it on the backs of camels through the desert; but the milk was so jolted about that the fat became churned into butter, and by accident the Arabs learned how to make this valuable food.

Even now, in India, the natives make butter by shaking milk in bottles. In that hot country butter quickly goes bad, so it has to be made each day. An Englishman in India usually has his supply of butter made fresh every morning, by a servant who churns cow's milk in a bottle.

In Europe peasants make butter by churning milk in goat-skins. The women of Armenia put milk into a sort of cradle made of goat-skin. This cradle is hung upon a frame and rocked until the fat of the milk becomes butter.

In the United States we grow enough wheat for ourselves and have much to spare for Europe, but we cannot send very much butter abroad. England must get a large part of her wheat from Canada, the United States, Argentina, or Russia, and gets much butter from Ireland, Denmark, France, and the United States.

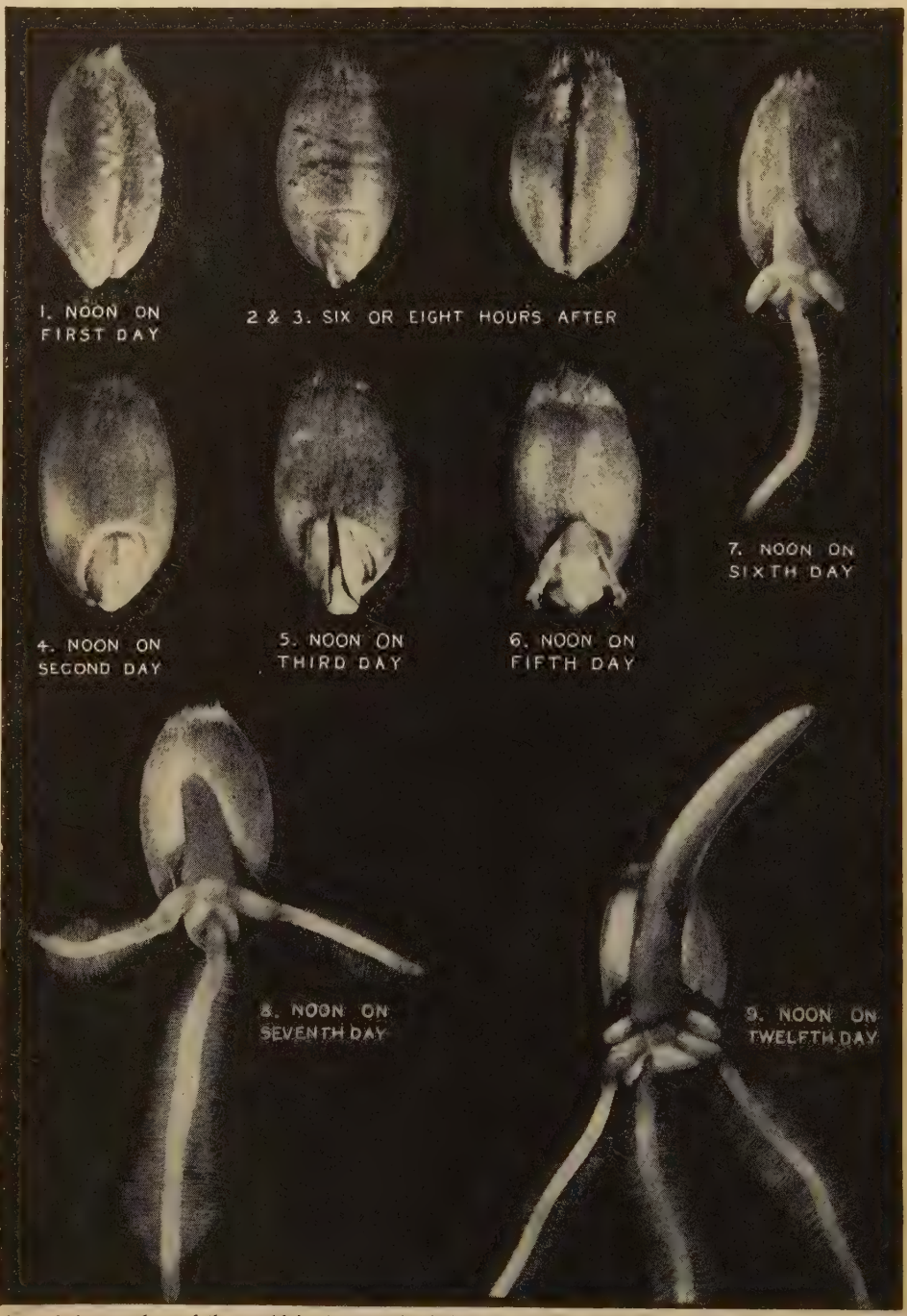
France must buy some wheat, but sells butter and cheese. The German Empire in ordinary years does not produce enough wheat for its needs, though it is able to sell rye. Denmark must buy wheat, but has a great deal of butter to spare. Few countries can so nearly produce what they need as our own.

WHERE THE WHEAT COMES FROM

The first step towards bread is to get the wheat. Here four ploughs drawn by horses, and one plough drawn by oxen, are ploughing the land ready for the sowing of the grain. This is a farm in Canada, one of the greatest wheat-growing countries in the world. Canada exports many million dollars' worth of wheat.

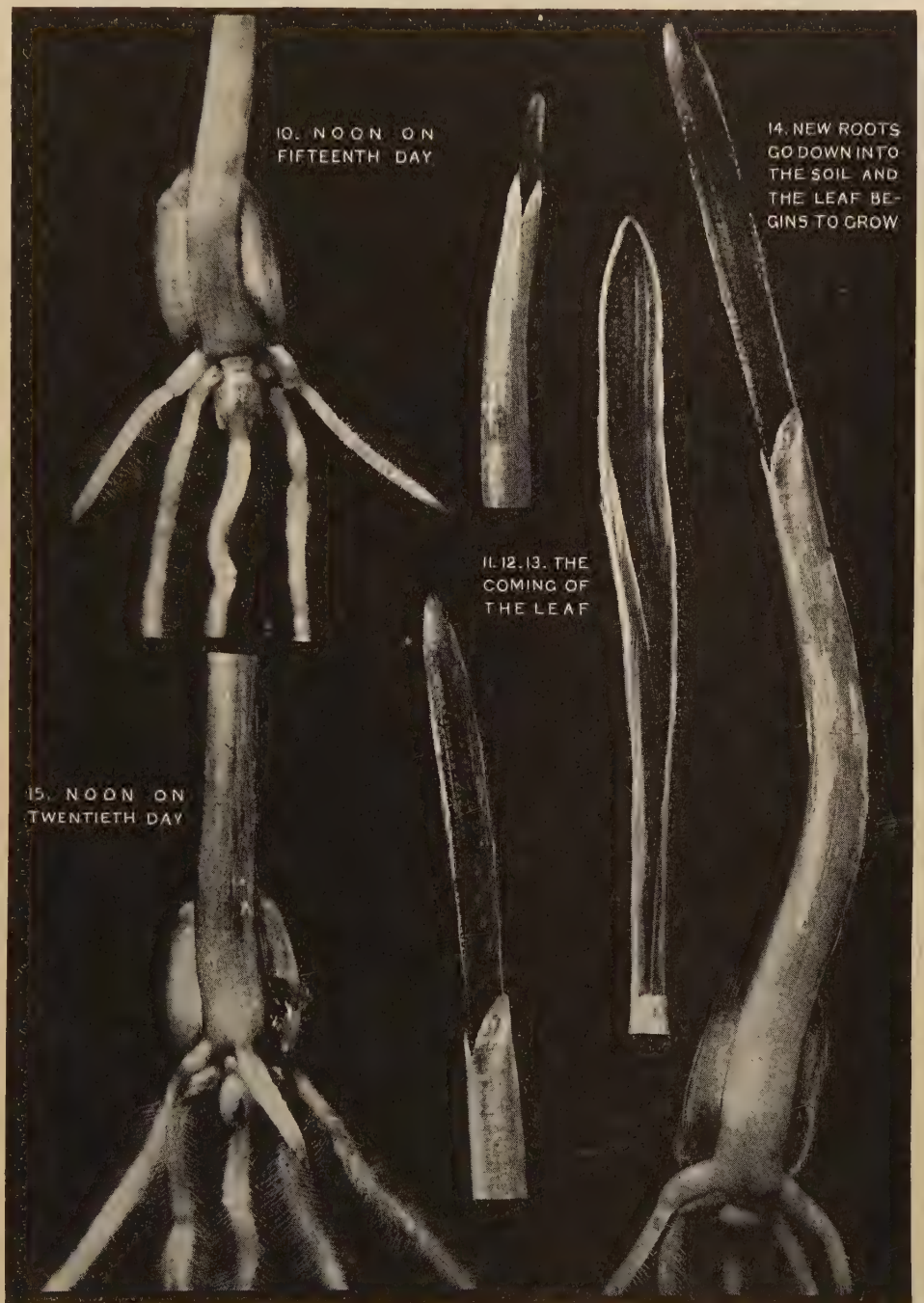
After the ploughing and sowing, the grain grows and multiplies and ripens for the harvest. Here is a field of wheat ready for cutting. The field in which it grows was prairie land thirty or forty years ago, with herds of wild buffaloes roaming over it. Now it is a leading wheat-growing country.

THE WONDERFUL BIRTH OF THE WHEAT


1. NOON ON FIRST DAY
2 & 3. SIX OR EIGHT HOURS AFTER
4. NOON ON SECOND DAY
5. NOON ON THIRD DAY
6. NOON ON FIFTH DAY
7. NOON ON SIXTH DAY
8. NOON ON SEVENTH DAY
9. NOON ON TWELFTH DAY

One of the wonders of the world is the growth of the wheat. The grain in the first picture was sown in wet sand at noon one day, and if we follow the pictures it is easy to see the great marvel that comes about. At the bottom of the grain in picture 2 is a little raised part. This is the germ or real seed; all the rest is simply a store of food to feed the seed until it can find food for itself. The channel down the middle in picture 3 is a little river-bed for the water collected by the hairy end of the grain; it brings the water to the seed. On the third day appears a sheath which guards the root in its early life, and on the fifth day a young shoot strikes out from the other end of this sheath. On the seventh day we notice that the root has grown down into the earth at a great rate, sending out little white hairs to search for moisture.

HOW WHEAT TAKES LIFE FROM THE EARTH

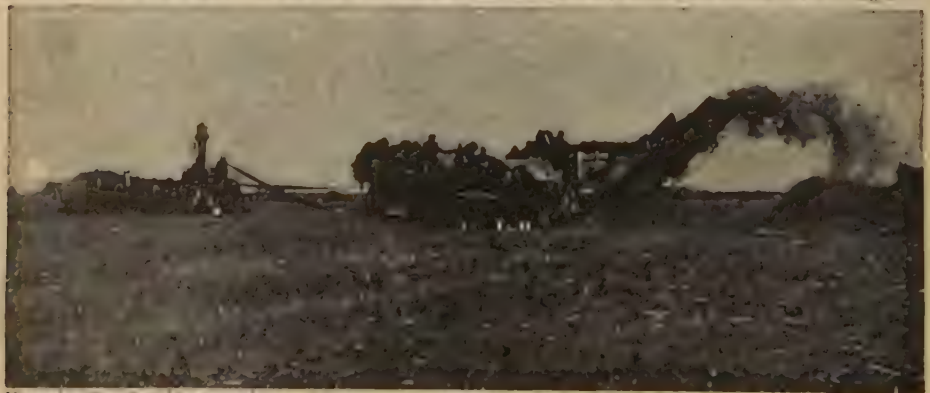

10. NOON ON FIFTEENTH DAY
14. NEW ROOTS GO DOWN INTO THE SOIL AND THE LEAF BEGINS TO GROW
11.12.13. THE COMING OF THE LEAF
15. NOON ON TWENTIETH DAY

The tip of the root of wheat is a wonderful thing; it takes in what it wants from the earth, and rejects what it does not want. On the twelfth day we see the beginning of two further roots, which grow remarkably by the fifteenth day; so that our baby plant has now five roots, all working in the earth for its benefit. All this time the plant is growing at the top, and we see the leaf come forth. This is about the sixteenth day, and the leaf grows as seen in the pictures from the sixteenth to the twentieth day. Of the wonderful way in which the roots take in food from the earth and build it up into wheat, we read in another part of our book; these photographs show us how the grain planted in the earth takes to itself new life, until, by its own powers, it reproduces itself, some 30, some 60, and some 100 fold.

HARVEST IN THE GREAT WHEAT-FIELDS

Here is a harvest field after machines have cut the grain. It is a big field, but only an ordinary one. It is quite common to find wheat-fields many hundred acres in extent. You can travel for hundreds of miles and see nothing but waving wheat. The only trouble is to get the grain harvested and off to market.

Big harvests must be reaped by big machines; the work could never be done by hand. Machines cut the grain and bind it up in sheaves, and other machines thresh it. Here the reapers and horses are working hard.



Here is the threshing machine, driven by a powerful engine. One cart brings up the sheaves. The thresher takes the grain from the ears, pours it into sacks, and throws the straw aside. The other cart takes the wheat away. All is haste and bustle, for much of the wheat is shipped over the sea to Europe.

THE MILLS THAT GRIND THE CORN

The wheat must now go to the mill to be ground into flour. Mills are driven by wind, water, steam, or electricity. This is a windmill. The arms of the windmill catch the wind, which causes them to revolve, and, by so doing, to set the grinding stones to work inside the mill. Nearly all the mills are driven by steam, and windmills and water-mills are rarely built. Steam-mills are more reliable, but the others are prettier.

When the miller at the water-mill grinds wheat, he closes gates, or sluices, in the stream, so causing the water to collect. When the water is released, it rushes over the wheel, and, catching in the traps upon it, makes it spin. The turning of the wheel makes the grinding stones go round and powder the wheat. Some mills have the wheel inside, the water flowing through a sluice making the wheel go round by racing under.

GREAT MODERN ROLLER MILLS

Photo copyright, Underwood & Underwood, N. Y.

Such mills as those on the page before are rarely seen now. Here are some of the great mills in the West, where thousands of barrels of flour are made every day by a different method. The wheat is crushed between heavy steel rollers. The cars bring the wheat to the doors of the mills and take away the flour.

Here is a nearer view of a large roller mill which can grind a hundred times as much wheat as the mills on the other page. The great circular tank-like structures are wheat elevators which take the wheat from cars or boats, and send it in to the mill as needed. Some of these elevators hold many thousand bushels. The flour is taken away by trucks, by railway cars, or else is loaded on boats in the river.

THE INSIDE OF A GREAT FLOUR MILL

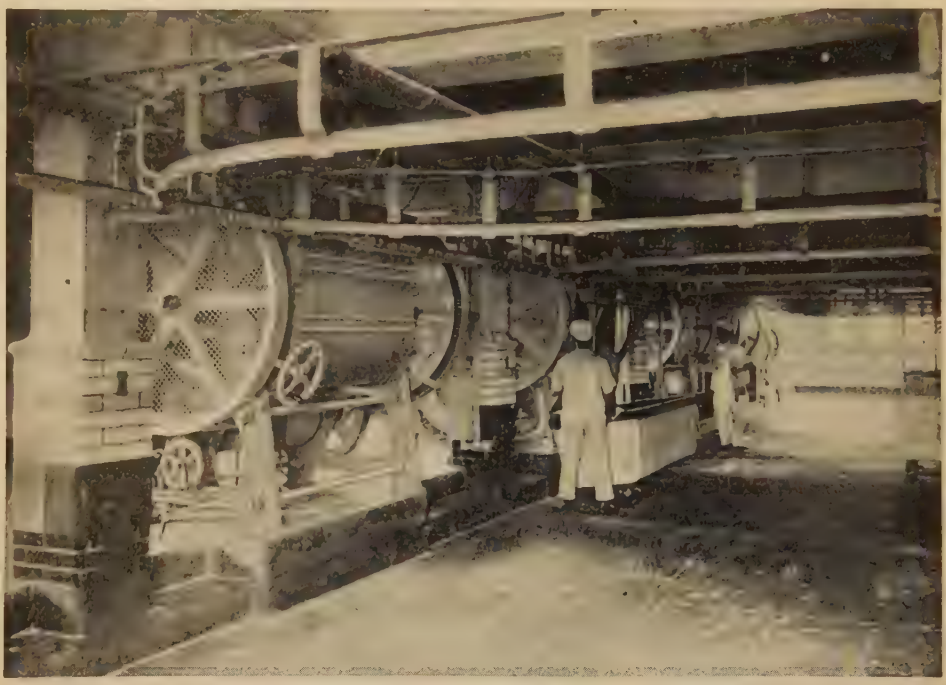
After being scoured to remove impurities wheat is led to these boxes which contain sets of steel or porcelain rollers. The first set break the kernel and each of the sets which follow are placed a little closer together than the set before.

After the products have gone through the different sets of rollers the flour is sifted out through silk cloths which are contained in these tanks. These are called bolting cloths and the flour which goes through is drawn off at the bottom.

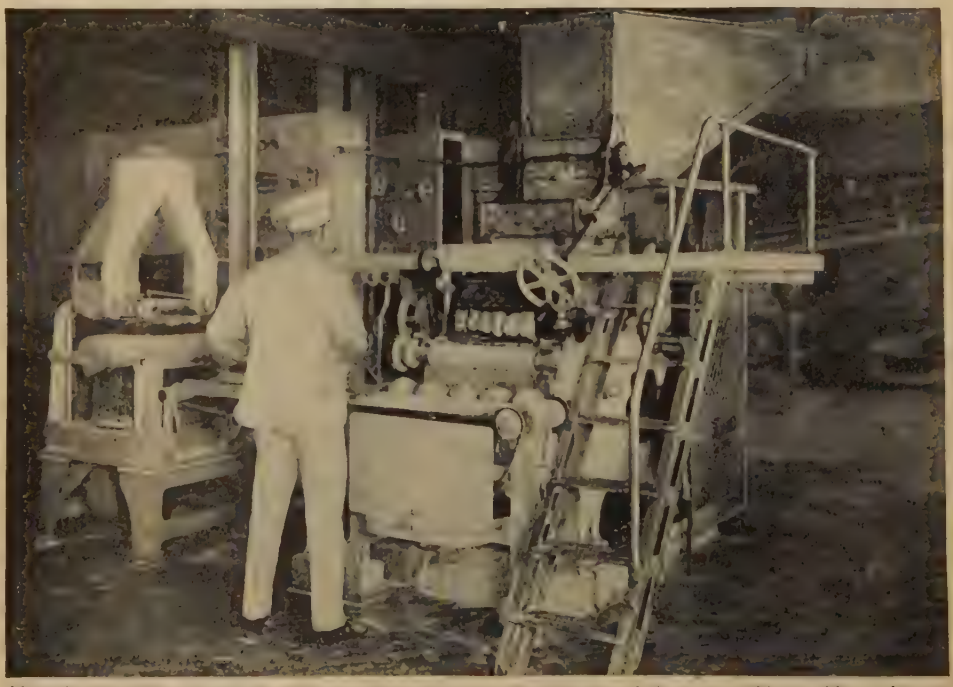
After the wheat has gone through the two machines shown above and many others, it is flour. Here it is being packed to go to the baker or the home. The weighing-machine will fill either barrels or sacks, and can be set to deliver any number of pounds. When the proper amount has come down the stream is shut off until another barrel is ready to receive it.

Pictures from Brown Bros.

IN A LARGE MODERN BAKERY



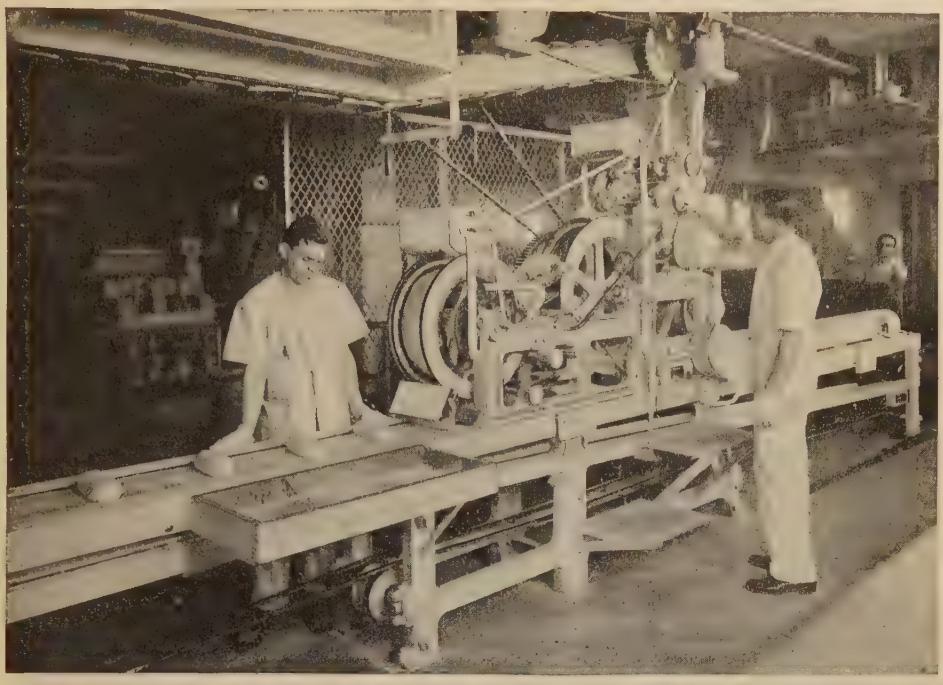
You have seen dough mixed by hand, but in a great modern bakery everything possible is done by machinery. All the ingredients are carefully weighed and then the dough is placed in these great mixers which knead it more thoroughly than can possibly be done by hand. Each machine mixes enough dough for 1,600 loaves of bread. Everything about a bakery must be kept clean.



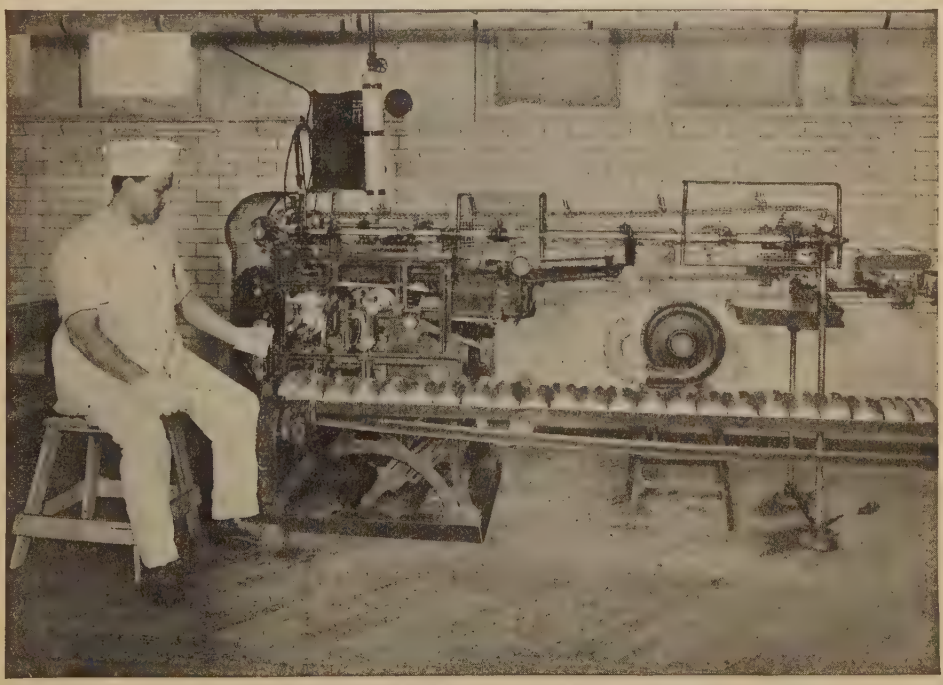
After the dough has been mixed thoroughly in the preceding machine it is sent to this machine. At every revolution of the cylinder in the centre enough dough to make six loaves is cut off and divided. The loaves are then shaped. The man in charge has very little to do unless something should go wrong.

Pictures on this page and the next by courtesy of the Ward Baking Co., New York.

BREAD NOT TOUCHED BY HANDS



The loaves next go through this machine on their way to the oven to be baked. As they go along each loaf is placed in a separate pan and travels along a belt toward the ovens which are not shown. You can see great piles of pans stacked on the right end of the machine, beyond the man in white.



These crusty brown loaves have been through the ovens and are now ready for food. In order that they may come to you perfectly clean this machine wraps each loaf in waxed paper and fastens the covering securely. You can see the uncovered loaves moving to the left in the lower belt and coming out of the machine and moving to the right above. These loaves will soon be distributed over the city.

WHERE THE BUTTER COMES FROM

Copyright by Underwood & Underwood, New York

After bread comes butter, which we get from the milk of the cow. This picture shows the interior of a model dairy barn which holds fifty cows. Every effort is made to keep the milk clean. The barn is light, the floor is of cement, which is kept clean by a hose; the cows are brushed and washed every day, and the men wear special suits of white duck which are put on at milking time and kept for that work only.

After the cream has stood for some time it is put into a churn. This is turned round and round until the butter forms in grains of fat. It is not yet allowed to form a solid mass. Water and salt are added to get rid of anything which might make the butter sour.

After the churning and the washing and soaking the butter is placed in brine for a quarter of an hour, and then comes out, as we see here, in small grains to be rolled. Each of these particles is butter, but it would not long keep sweet and pure in this condition.

MAKING BUTTER BY MACHINERY

On the other page you saw how butter is made on a farm or in a small dairy. In this large factory the cream is first pasteurized and then is run into the great churns which break up the fat globules and collect them as butter. The moisture is worked out by machinery, the butter is removed from the churns and then goes to the next room to be packed for market.

The butter must be made into prints by hand. The moulds are filled from the great mound of butter on the table and the blocks are weighed and wrapped in parchment paper. They are then packed in boxes and taken to the cooling room to become thoroughly chilled. Unless this is done, it cannot be shipped. Pictures by Brown Bros.

THE PICTURE-STORY OF PUSS IN BOOTS

Here we have in pictures the story of Puss in Boots. At the top we see the clever cat receiving the boots from the miller's son and then catching a rabbit. He gave this to the king as a present from his young master, and afterwards he killed the ogre when he had turned into the shape of a mouse. Then we see the cat's young owner and the beautiful princess, the king's daughter, falling in love with one another.

PUSS IN BOOTS

CONTINUED FROM 1111

A MILLER had three sons, and on his death-bed he left his mill to the eldest, his ass to the next, and his cat to the youngest.

The youngest son was at first disappointed with his share of his father's property, but the cat said to him:

"My dear master, buy me a pair of boots and a sack, and I will soon show that I am more useful than a mill or an ass."

So the youngest son spent all his money in buying his cat a handsome pair of boots and a sack.

The cat put on the boots, and then slung the sack on his shoulder, and went to a warren. There he opened the sack, put some bran in it, and lay down as if he were dead. Soon a rabbit smelled the bran and ran into the sack and the cat at once caught the rabbit and killed it, and took it to the king, and said:

"Sire, the noble Marquis of Carabas desires me to bring you this rabbit. Boiled with onions, you will find it makes an excellent dish."

"Rabbit?" said the king. "How delightful! I love rabbit, but my cook can never catch any. Pray thank your noble master for me."

The next morning the cat caught two partridges, and brought them to the king as a present from the Marquis of Carabas. The king was so pleased that he at once called for his royal carriage to take him and his daughter, the princess, on a visit to the neighbour who had sent him such fine gifts.

The cat hastened back to the youngest son, and said:

"Come with me at once and I will show you a place in the river where you can have a good bath."

The cat took him to a spot where the royal carriage was about to pass, and told him to undress, and hide his clothes under a stone, and get into the water. He had just entered the river when the king and the princess drove by.

"Help! help!" shouted the cat.

"What's the matter?" said the king.

"Some thieves have stolen the clothes of the noble Marquis of Carabas," said the cat. "My master is in the water, and if he stays there much longer he will certainly get a cramp."

The king ordered his attendants to run to the palace and bring the finest suit of clothes they could find, and presently they returned with a gorgeous dress which the king had worn in his youth.

The youngest son put it on, and he looked so handsome in it that the princess fell in love with him as soon as he entered the royal carriage. The king was also touched, and he whispered to his daughter:

"That's just how I looked twenty years ago, when I went to woo your mother."

The cat was delighted at the success of his scheme, and, running on in front

Copyright, 1908, by Amalgamated Press, Ltd.

of the royal carriage, he came to some wheatfields and meadows, and said to the people working there:

"The king is coming, and unless you tell him that these wheatfields and meadows belong to the noble Marquis of Carabas, you will be chopped into mincemeat."

So when the king passed by and asked them to whom the wheatfields and meadows belonged, they said:

"To the noble Marquis of Carabas."

"Dear me!" said the king to the youngest son. "What a fine estate you have!"

The youngest son smiled in a bewildered way, and the king said in whisper to the princess:

"I was just as bewildered when I went courting."

The cat still ran on in front of the royal carriage, and passed through a forest and came to a magnificent palace. In the palace lived an ogre, to whom the wheatfields and the meadows really belonged, and the cat at once called upon the ogre, and said to him:

"My dear ogre, what wonderful tales everybody tells about you! Is it true that you can change yourself into any shape that you please?"

"It is quite true," said the ogre.

And he at once changed himself into a lion.

"That's nothing," said the cat. "Anybody can puff himself up into something bigger than he really is. But it is only the wise who can make themselves appear smaller than they indeed are. Can you, for instance, turn yourself into a mouse?"

"It's just as easy," said the ogre.

He then changed himself into a mouse, and the cat pounced on him and gobbled him up, and ran down and opened the gate just as the royal carriage arrived.

"Welcome, sire, to the palace of the Marquis of Carabas," said the cat.

"Dear me!" said the king to the youngest son. "What a fine palace you have! Kindly help the princess to alight."

The youngest son shyly offered his arm to the princess, and the king then said to her in a whisper:

"I was just as shy when I went courting."

In the meanwhile the cat whisked into the kitchen, ordered an elaborate luncheon, and got all the choicest wines out of the cellar, and by the time that the king and the princess and the youngest son were seated at table the repast was ready.

After making a very enjoyable meal, the king turned to the youngest son and said:

"You are just as bashful as I was when I went courting. But I can see you are as deeply in love with the princess as she is with you. Why don't you propose to her?"

The youngest son then asked the princess to be his wife, and she consented, and in a short time they were married in great state. The cat came to the marriage feast in a new pair of boots with crimson leather tops set with two rows of the very finest diamonds.

THE FAIRIES AND THE HUNCHBACKS

EVERY Irishman, from Bunclody to Enniscorthy, knows of the fairy fort between Tombrick and Munfin.

In appearance it is only a level field encircled by a high mound. But Patsy Blake, a poor little hunchback, who had been turned out of house and home by his landlord, fell asleep there one moonlight night, and was suddenly awakened by the sound of sweet music.

He saw a light streaming from a doorway in the mound, and entered, and crept along into a beautiful palace under the earth. Thousands of lights hung from the roof, and hundreds of pretty fairies in green coats and green gowns, with red caps on their heads, danced on the polished floor. As they danced, they sang over and over again:

"Monday, Tuesday! Monday, Tuesday!
Monday, Tuesday!"

"That is a good tune," said Patsy, with a deep bow. "But it's short. Now, suppose you made it run like this:

"Monday, Tuesday! Monday, Tuesday!
Monday, Tuesday, and Wednesday!
Thursday, Friday! Thursday, Friday!
Thursday, Friday, and Saturday!"

The fairies at once took it up, and made the palace ring with the

new song, and their leader said to Patsy:

"That is a great improvement. Now, if there is anything we can do for you, say the word, and it shall be done."

"If you would kindly take the hump off my back," said Patsy, "you would make me the happiest man in Ireland."

The fairies not only took his hump away, but they brought out a sack of gold, and Patsy filled his pockets with half of it, and left the rest.

"That's nothing of a song you're singing," he said. "Why don't you bring in all the days of the week, like this:

"Monday, Tuesday, Wednesday,
Thursday, Friday, Saturday,
And Sun-Sun-Sunday!"

Mickey, as you see, had no ear for verse or music.

But that was not the worst of it. The fairies were heathens, and nothing made them so angry as to hear anyone speak of Sunday, as that was the holy day of Christian people.

THE HUNCHBACK TEACHES THE FAIRIES A NEW SONG

In the morning he hurried to his landlord and paid his rent, and recovered possession of his farm.

The landlord was also a hunchback; but he was a hard, miserly man. His name was Mickey Desmond.

"You are looking well, Patsy," he said. "Where did you get your money?"

Patsy told him about the fairy palace, and the next night Mickey went there to see if he could get something from the fairies.

As soon as the doorway opened he tramped into the palace, and shouted to the dancers.

So they gathered in anger about Mickey, and their leader said in a threatening tone:

"Why did you come here?"

"To get what Patsy left behind," said Mickey, thinking of the half sack of gold.

"Then you shall indeed get what Patsy left behind," said the fairy.

Then taking Patsy's hump out of a bag, he put it on Mickey, and from that time the miserly old landlord had two humps between his shoulders instead of one, and so he was punished for his avarice and for trying to deceive the fairies.

THE WIZARD'S CASTLE IN THE AIR

A FAIRY STORY FROM SPAIN

MANY years ago, when wizards had the power of enchantment, a great wizard built a castle in Spain, and hung it up between the earth and sky. Astonished at its wonder, the court and the people came out of the city to view it, and first among them all rode the beautiful Princess Isabella, the only daughter of the king. The people loved her, and there was not one of them who would not have died for her; but when, while they gazed at the work of enchantment, the wizard came and carried her off to his castle, they could only look helplessly on.

When the king learned of his loss, he commanded his soldiers to make great ladders, and storm the castle, saying: "He who rescues my daugher shall have her for his bride."

But the soldiers could not make a ladder long enough to reach the castle. One by one they gave up the task and went away, and at last, only Diego, a little peasant lad, was left.

Diego did not know despair. Day after day he worked, practising archery, and when he could send his arrows far and wide, and always found the mark he sought, he knew the time had come to achieve his heart's desire, and rescue the princess from her prison walls.

Then he got a quantity of string, tied hundreds of yards to his arrows, shot them deep into the oaken gate, and twisted the strands of string into a stout rope that would bear his weight. A gipsy who stood by said, "Let me help you," and so Diego asked him to watch the rope. Then he slung his bow across his shoulders, took his last and sharpest arrow between his teeth, and went up the rope, hand over hand, until he reached the castle walls.

Now when the wizard heard the arrows strike the castle gate, he thought that someone was throwing stones against it, and in great wrath he went out to see. He was too late. Diego had already climbed the battlements, and fixed his last and sharpest arrow to his bow, and as the wizard turned the corner, he shot him dead. Then the fearless youth strode into the castle, and found the princess there. He led her out, fastened the rope securely about her, and lowered her gently to the gipsy waiting down below.

But the gipsy proved unworthy of his trust. The moment that the princess reached the ground, he set fire to the rope, placed the princess on a horse, and galloped off with her to the palace. There he told a lying tale of how he had killed the wizard, and rescued the princess. Diego, he said, was his servant, whom he had sent up to lower her into his arms, and he had burned the rope, and left him in the castle as its caretaker.

The princess felt in her heart that this was not true, but the king believed the story. The gipsy was received at court as the future sovereign, and great preparations were made for the marriage.

Meantime, however, Diego was not idle. He soon found the mechanism by which the wizard had raised and lowered the castle at his will, and the wheel with which he had steered it through the air. He quickly learned how to work the stearing-gear, at once set out on his voyage to Madrid, and lowered the ponderous building to a place beside the cathedral, just as the wedding procession of the gipsy and the princess approached along the street.

At sight of him, as he appeared outside the castle gate, the gipsy sprang from the carriage, took to his heels and fled. Not so the princess. She turned to her father with dignity, and said:

"This is the youth who really came to my rescue and killed the wizard."

"Then," said the king bluntly, "he shall marry you."

Immediately the wedding procession moved on again with Diego as the bridegroom. He was happily married to the princess, and when the king died some few years afterwards, Diego, who was much beloved by the people, reigned in his place.

DIEGO, THE PEASANT LAD, AND THE GIPSY

One day a gipsy man came and found Diego tying yards of string to his arrows. "I'll stay and help you," said the gipsy man. Diego shot the arrows into the gate of the castle where the princess was imprisoned.

THE MAN WHO DISAPPEARED

A TALE OF A WINTER'S NIGHT IN THE DAYS OF NAPOLEON

ONE winter's night, in the year 1809, an English gentleman named Bathurst, with a secretary and a valet, stepped hurriedly into a carriage in Vienna and drove rapidly away into the darkness.

Mr. Bathurst had been planning with the Emperor of Austria how England and Austria could combine to destroy the tyrant Napoleon. Napoleon's victories had caused the failure of this mission, and Mr. Bathurst, very much frightened as to what Napoleon would do to him if he laid hands on the English Ambassador Extraordinary, was driving secretly away from Vienna on the long journey to England.

He wore a heavy sable cap on his head, a splendid sable coat lined with violet-colored velvet, and in his scarf was a valuable diamond. He concealed all his papers, and passed himself off as a merchant traveling with a courier and a servant.

In the course of his dangerous journey the Ambassador arrived at a little town in Brandenburg, where it was necessary for him to change horses. He went to an inn called the White Swan, where he ordered dinner. Then he asked who was in command of the soldiers in the town, and went out to interview this important person.

There was a lady present with the officer when Bathurst was admitted, and she has left it on record that the Englishman was so stricken with nervousness that he could not hold a cup of tea. Bathurst explained that he was a merchant, that he was on the road to Hamburg, and that he had good reason to believe his life was in danger. Would the captain kindly send a guard of soldiers to be posted at the inn till his departure?

The officer laughed at the merchant's fear, said that no harm would happen to him in the town, but, to set his mind at rest, gave orders for two soldiers to be posted at the White Swan. Bathurst withdrew, still so nervous that he could hardly get into his sable coat with the violet-colored lining.

How the officer and the lady must have laughed when the door was shut on this frightened Englishman!

Arrived at his inn, and thinking he could best avoid Napoleon by traveling at night, he gave fresh orders, and remained in a room all the evening tearing up and burning papers. During this time two Jewish merchants drove up and entered the inn.

When he was ready, Bathurst, ordered the horses to be put to, dismissed the soldiers, and went down the stairs to see his portmanteau placed at the back of the carriage. It was a dark and windy night; the ostler carried a lantern while he busied himself with the harness of the horses; the valet shivered at the carriage door. Bathurst's secretary stood under the porch settling the bill with the landlord. Bathurst walked to the horses' heads, and the light from the ostler's lantern fell upon him for a moment as he stood there. *That was the last time he was ever seen!* The lantern's dim light flashed away from him, and with that flicker of light the great Ambassador vanished into darkness.

No one thought of looking for him just then, but in a few minutes, when the horses were ready and the door of the carriage stood open for his entrance, it was discovered that he had disappeared. They went up to his room, they hurried round the stables, they called to him in the dark night. All in vain. The darkness had swallowed him. While this commotion was going on, the two Jews ordered their carriage and drove away.

The captain was told of Mr. Bathurst's disappearance, and hurried to investigate the mystery. Not a minute was lost. Bathurst's servant and secretary were put under arrest; the carriage with all its belongings was carried to the barracks, and a search was instituted. The marshes were searched, the woods were beaten, the river was dragged. The whole town was seeking for the Englishman. In vain. No trace could be found. The frightened Englishman had disappeared.

A month afterwards the trousers of the unfortunate Ambassador were found in a wood; and during the next year the fur coat with the violet-colored lining was discovered in the cellar of some poor people named Schmidt, hidden behind

a pile of rough wood. The woman Schmidt declared that she had found the coat in the post-house, and nothing could be proved against her.

In England people believed that Napoleon had caused the murder of Bathurst, and so bitter was English feeling on this point that Napoleon actually wrote to the widow of Bathurst assuring her that he knew nothing whatever of the crime.

Suspicion rested on the two Jews. But they were found, examined, and discharged. At last people came to think that, overcome by terror, Bathurst had killed himself. Time passed away, and people almost forgot the matter.

Nearly fifty years afterwards, however, a hovel on the road to Hamburg was being pulled down, when a skeleton was discovered under the stable floor. The back of the skull showed the trace of a blow. The ownership of the house was traced back to the year of Bathurst's disappearance. In those days it was owned by a man named Mertens, who had been a servant at the White Swan.

Then it came out that old Mertens had given one of his daughters $750, and another $600. At the death of Mertens' wife, she showed signs of wishing to confess something, but before she could utter words she sank into unconsciousness and died.

That is all we shall ever know of this mysterious disappearance. It looks as if the man who was frightened of Napoleon had been called away from the horses' heads on that dark night by the servant Mertens, who, pretending that he had some wonderful information to impart, lured the poor Englishman into his yard, and there brutally murdered him for his money and his diamonds.

It is an ugly ending, is it not, to a story of extraordinary mystery?

The light from the ostler's lantern fell upon Bathurst for a moment. That was the last time he was ever seen.

THE ROSE MAIDEN

PRINCE MARIN, the only son of the King of Moldavia, was as proud as he was handsome. The king wanted him to marry, and invited every beautiful princess he heard of to his palace, in the hope that the prince would fall in love. But he liked none of them, and at last the king said:

"You are hard to please. Go! Find a wife for yourself. But, remember, if you return without a bride, I shall disinherit you."

So the prince set out, and after traveling many days, he came to a great forest, and stopped to rest. He tethered his horse in the shade, and lay down on the soft moss beneath a large rose-tree, covered with flowers. But, as he sank to sleep, he heard a soft voice sing:

"Rose-tree, rose-tree, green and fair,
Open and let me take the air."

And as he sprang to his feet, the rose-tree opened, and out came a lovely rose maiden. All the beauty and sweetness of all the roses in the world were in her face, and her long golden hair shone in the sunlight. The prince bowed low before her and, seating her on the soft moss, he placed himself beside her, and they sat and talked until they fell asleep.

Prince Marin was the first to awake, and he stood for some time, looking down on the sleeping maiden.

"She is indeed lovely," he said at last, "but I do not want to marry yet. I shall go on more adventures," and he rode away.

When the rose maiden awoke, she thought at first she had been dreaming. But when she saw the marks left by the horse's hoofs, she knew that all was true, and feeling sad and lonely, she said: "I will wait here till the prince returns," and she sang:

"Rose-tree, rose-tree, fair and green,
Open and let me wait within."

The rose-tree opened and out came a rose maiden.

"I cannot let you in any more," said the rose-tree. "A mortal has kissed you."

Then the forsaken maiden turned to follow the prince, but happily she took the wrong path. She followed the track back to Jassy and, as the prince returned by another way, she met him at the city gate. He had come home without a bride, for having seen the rose maiden, he could find no beauty in any other, and so, when he saw her he gave a shout of joy. Taking her hand, he led her to the king, and next day they were married with great rejoicing.

THE NEXT STORIES BEGIN ON PAGE 1199.

THE POETRY OF ACTION

CONTINUED FROM P. 1062

SOME unknown but wise man is said to have believed that, "if a man were permitted to make all the ballads, he did not care who should make the laws of a nation." This saying is often quoted, as it deserves to be; for it is a testimony to the great power of poetry over the minds and hearts of men.

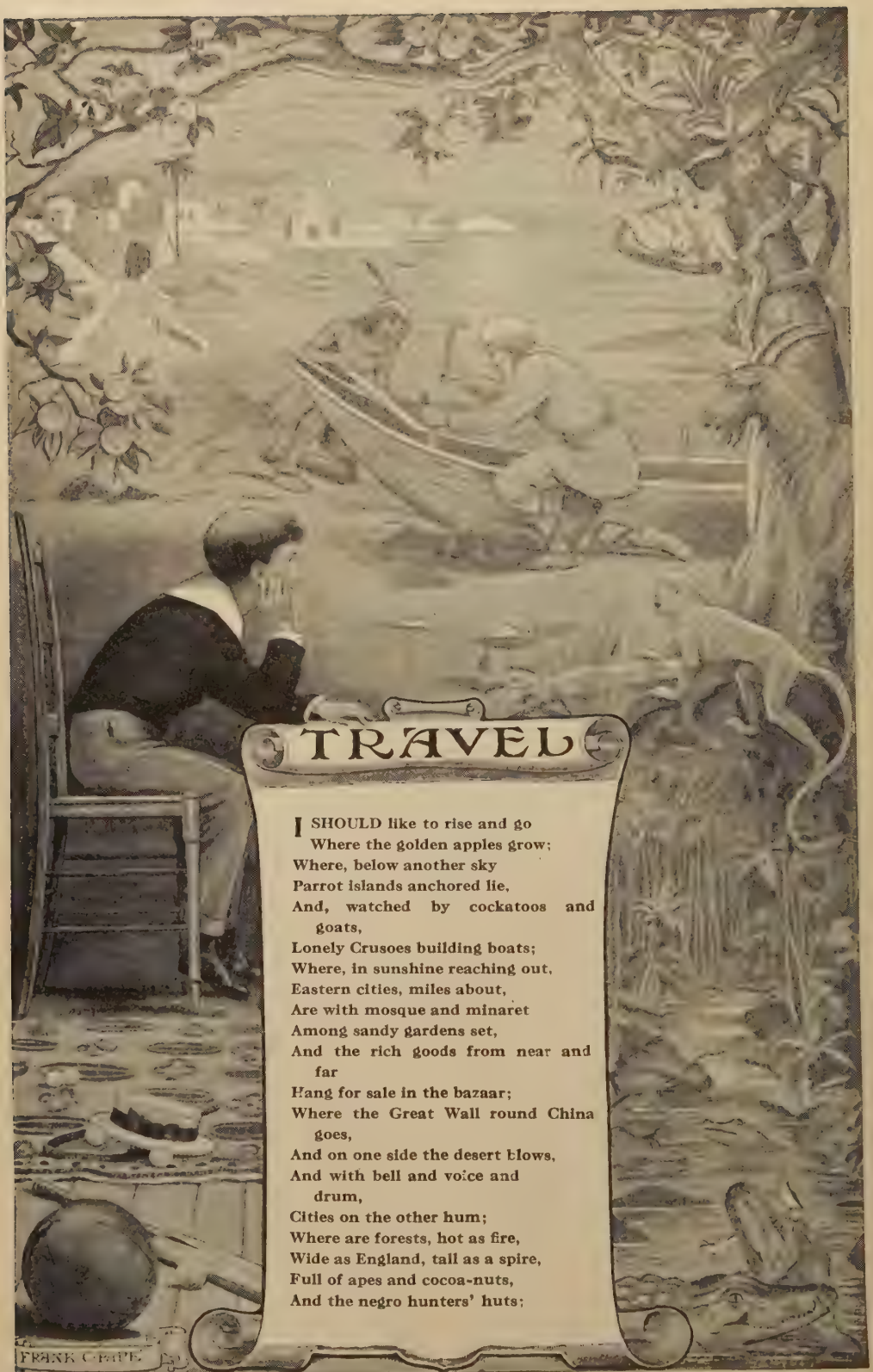
Heroism and patriotism are favorite subjects for the appeal of the poets, and wonderful has been the result of many heroic and patriotic poems. It is true that once the people of a country have caught the inspiration of some patriotic song, that song will do far more to move them and quicken them with love for their country than any law-making would do. What is now the national anthem of the French Republic, that grand song, set to inspiring music, "The Marseillaise," was written by an army officer for the encouragement of the soldiers and the populace in the days of the French Revolution. The influence of that song on the destiny of France cannot be estimated, and it lives now, more than a century after the Revolution, as an everlasting call to war against tyranny and oppression, a song of freedom for all the world. Truly the power of poetry is greater than we might suspect.

At all times of public excitement poetry has played its part, and very poor poetry has often had great influence on the public.

Later, in Great Britain, a great reform was influenced by popular songs. It was due largely to a group of poets, now mostly forgotten, chief of whom was Ebenezer Elliott, "the Corn Law rhymer," that the working people of England were roused against the old Corn Laws, which the Government was induced to abolish in the year 1846. Of course, many warlike poems have been written after the event, such as "The Charge of the Light Brigade" and "Paul Revere's Ride." These are not less inspiring because they record history, for history is the source of all inspiration to noble effort; history and legend have supplied more themes to the poets than their own imagination could invent. Macaulay's "Lays of Ancient Rome" are among our finest heroic poems, and were written many centuries after the events they celebrate took place.

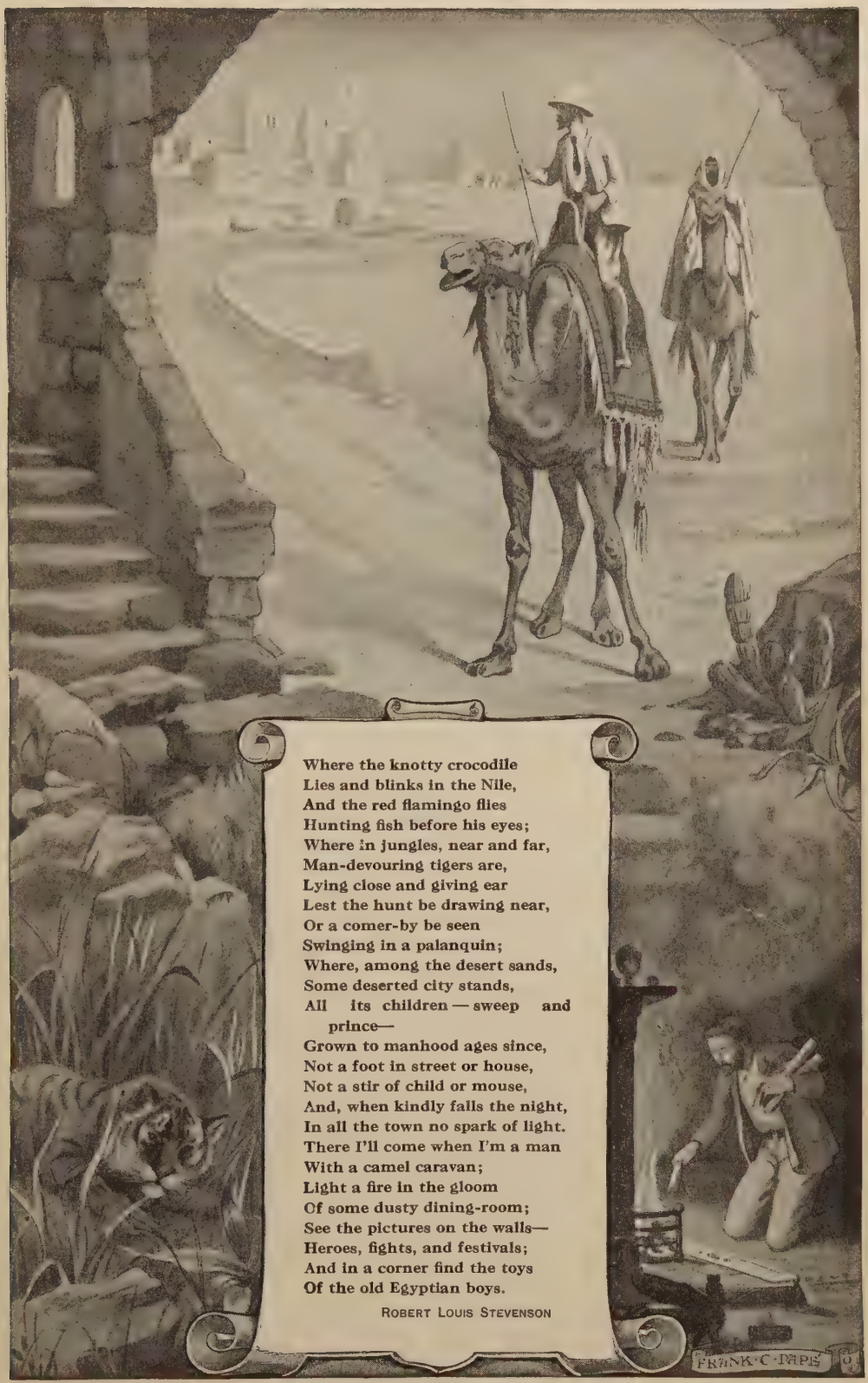
There is, indeed, an immense amount of verse that may be called "the poetry of action," in praise of heroism, self-sacrifice, patriotism. But it is easy to be led astray by the jingle of words if our mind is already disposed to a certain action and the words favor that. So that poetry is as dangerous as it is powerful, and may mislead as well as lead. It is easy to sound the praises of our own land and the deeds of our own soldiers; it is more difficult to see the good in other lands and peoples. That we can best do in the quiet, thoughtful days of peace, as we shall see in our next and concluding lesson.

Copyright, 1908, by Amalgamated Press, Ltd.



I SHOULD like to rise and go
Where the golden apples grow;
Where, below another sky
Parrot islands anchored lie,
And, watched by cockatoos and goats,
Lonely Crusoes building boats;
Where, in sunshine reaching out,
Eastern cities, miles about,
Are with mosque and minaret
Among sandy gardens set,
And the rich goods from near and far
Hang for sale in the bazaar;
Where the Great Wall round China goes,
And on one side the desert blows,
And with bell and voice and drum,
Cities on the other hum;
Where are forests, hot as fire,
Wide as England, tall as a spire,
Full of apes and cocoa-nuts,
And the negro hunters' huts;

From "Poems and Ballads," copyright 1895, 1896, by Charles Scribner's Sons.



Where the knotty crocodile
Lies and blinks in the Nile,
And the red flamingo flies
Hunting fish before his eyes;
Where in jungles, near and far,
Man-devouring tigers are,
Lying close and giving ear
Lest the hunt be drawing near,
Or a comer-by be seen
Swinging in a palanquin;
Where, among the desert sands,
Some deserted city stands,
All its children — sweep and prince—
Grown to manhood ages since,
Not a foot in street or house,
Not a stir of child or mouse,
And, when kindly falls the night,
In all the town no spark of light.
There I'll come when I'm a man
With a camel caravan;
Light a fire in the gloom
Of some dusty dining-room;
See the pictures on the walls—
Heroes, fights, and festivals;
And in a corner find the toys
Of the old Egyptian boys.

ROBERT LOUIS STEVENSON

THE LITTLE STAR

Jane Taylor was one of a family distinguished for their literary work in the first half of last century. With her sister Ann she wrote several books of simple hymns and verses which were great favorites in the young days of the older folk now living. "The Little Star" is one of the prettiest and simplest of Jane Taylor's poems for children.

TWINKLE, twinkle, little star;
How I wonder what you are!
Up above the world, so high,
Like a diamond in the sky.

When the blazing sun is gone,
When he nothing shines upon,
Then you show your little light,
Twinkle, twinkle, all the night.

Then the traveller in the dark,
Thanks you for your tiny spark;
He could not tell which way to go
If you did not twinkle so.

In the dark blue sky you keep,
And often through my curtains peep,
For you never shut your eye
Till the sun is in the sky.

As your bright and tiny spark
Lights the traveller in the dark,
Though I know not what you are,
Twinkle, twinkle, little star.

QUEEN MAB

Thomas Hood, who died in 1845, was a very gifted poet and brave man. He wrote several poems that will never be forgotten, and when battling with ill-health and disease he wrote many comic poems which have set everybody laughing who has read them, and will make many more laugh in the days to come. For he could be humorous as well as pathetic, and was very clever in his mixtures of grave and gay fancies. In "Queen Mab" he is neither, but just fanciful, which suits young folk best of all. Queen Mab reigns over the fairies.

A LITTLE fairy comes at night,
Her eyes are blue, her hair is brown,
With silver spots upon her wings,
And from the moon she flutters down.

She has a little silver wand,
And when a good child goes to bed
She waves her wand from left to right,
And makes a circle round its head.

And then it dreams of pleasant things,
Of fountains filled with fairy fish,
And trees that bear delicious fruit,
And bow their branches at a wish:

Of arbours filled with dainty scents
From lovely flowers that never fade;
Bright flies that glitter in the sun,
And glow-worms shining in the shade.

And singing birds with gifted tongues,
For singing songs and telling tales,
And pretty dwarfs to show the way
Through fairy hills and fairy dales.

But when a bad child goes to bed,
From left to right she weaves her rings,
And then it dreams all through the night
Of only ugly, horrid things!

. . . .

Then wicked children wake and weep,
And wish the long black gloom away;
But good ones love the dark, and find
The night as pleasant as the day.

ABOU BEN ADHEM AND THE ANGEL

This famous poem by Leigh Hunt is not to be taken as teaching us that it is better to love our fellow-men than to love God. You might think that, at first reading. The real purpose of the poem is to teach us that while there are many people who are ready to proclaim that they love the Lord, not so many are ready to love their fellow-men. Yet God is best worshipped by our loving our fellow-men. The disciple John gave a new commandment—That ye love one another.

ABOU BEN ADHEM (may his tribe increase!)
Awoke one night from a deep dream of peace,
And saw, within the moonlight of the room,
Making it rich, and like a lily in bloom,
An angel writing in a book of gold;
Exceeding peace had made Ben Adhem bold,
And to the Presence in the room he said,
"What writest thou?" The vision rais'd his head,
And with a look made all of sweet accord,
Answer'd, "The names of those who love the Lord."
"And is mine one?" said Abou. "Nay, not so,"
Replied the angel. Abou spoke more low,
But cheerily still; and said, "I pray thee, then,
Write me as one who loves his fellow-men."

The angel wrote, and vanish'd. The next night
He came again with a great wakening light,
And show'd the names whom love of God had bless'd,
And lo! Ben Adhem's name led all the rest.

THE NORTH WIND

THE north wind doth blow,
And we shall have snow,
And what will poor Robin do then, poor thing?

He'll sit in a barn,
And keep himself warm,
And hide his head under his wing, poor thing.

*MOTHER'S KISSES

This pretty little poem was written by Lilla T. Elder.

"I'M writing to Mother," Alice said,
"And I'm making some kisses big and round!
She'll hold them close to her lips, like this,
And make a sweet little kissing-sound."

"Are kisses round?" little Mary asked,
"I'm sure they never feel so to me,
They feel like stars. Mother's do, I know,
And I'd draw them this way—star-shaped—see!"

"Like stars? Oh, Mary, how queer you are!
What funny thoughts you get in your head!"
"Alice, it's true! Don't you feel so, too,
When night-time comes and we're tucked in bed?
"And Mother comes softly in—in the dark—
And we see a twinkle of something bright,
When she kisses us then; don't you feel as if
Her kisses were stars dropped out of the night?"

A TRAGIC STORY

Originally written in German, this little humorous poem was adapted into English verse by Thackeray, the great novelist.

THERE lived a sage in days of yore,
And he a handsome pigtail wore;
But wondered much, and sorrowed more
Because it hung behind him.

He mused upon this serious case,
And swore he'd change the pigtail's place
And have it hanging at his face,
Not dangling there behind him.

Says he, "The mystery I've found—
I'll turn me round"—he turned him round;
But still it hung behind him.

Then round and round, and out and in,
All day the puzzled sage did spin;
In vain—it mattered not a pin—
The pigtail hung behind him.

And right and left, and round about,
And up and down and in and out
He turned; but still the pigtail stout
Hung steadily behind him.

And though his efforts never slack,
And though he twist, and twirl, and tack,
Alas! still faithful to his back,
The pigtail hangs behind him.

JOY OF LIFE

Mary Russell Mitford was a famous English writer, both of poetry and prose, who died in 1855. These bright verses on the happiness of Nature's life were written by this lady.

THE sun is careering in glory and might,
'Mid the deep blue sky and the clouds so bright;
The billow is tossing its foam on high,
And the summer breezes go lightly by;
The air and the water dance, glitter, and play—
And why should not I be as merry as they?

The linnet is singing the wild wood through,
The fawn's bounding footsteps skim over the dew,
The butterfly flits round the blossoming tree,
And the cowslip and blue-bell are bent by the bee:
All the creatures that dwell in the forest are gay,
And why should not I be as merry as they?

*Copyright, 1903, by the Alliance Publishing Co.

THE LION AND THE MOUSE

The interesting story of the lion and the mouse is perhaps one of the best known of Œsop's Fables. But although we may have read it before, it is well worth reading again, and here it is put into verse, for young readers, by Jeffreys Taylor.

A LION with the heat oppress'd,
One day composed himself to rest
But whilst he dozed as he intended,
A mouse his royal back ascended;
Nor thought of harm, as Æsop tells,
Mistaking him for someone else;
And travell'd over him, and round him,
And might have left him as he found him
Had he not—tremble when you hear—
Tried to explore the monarch's ear!
Who straightway woke, with wrath immense,
And shook his head to cast him thence.
"You rascal, what are you about?"
Said he, when he had turned him out.
"I'll teach you soon," the lion said,
"To make a mouse-hole in my head!"
So saying, he prepared his foot
To crush the trembling tiny brute;
But he (the mouse) with tearful eye,
Implored the lion's clemency,
Who thought it best at last to give
His little pris'ner a reprieve.

'Twas nearly twelve months after this,
The lion chanced his way to miss;
When pressing forward, heedless yet,
He got entangled in a net
With dreadful rage, he stamped and tore,
And straight commenced a lordly roar;
When the poor mouse, who heard the noise,
Attended, for she knew his voice.
Then what the lion's utmost strength
Could not effect, she did at length;
With patient labour she applied
Her teeth, the network to divide;
And so at last forth issued he,
A *lion*, by a mouse set free.

Few are so small or weak, I guess,
But may assist us in distress,
Nor shall we ever, if we're wise,
The meanest or the least despise.

THE TIGER

The author of this wonderful poem, William Blake, was a man of strange thoughts. Here he expresses the great wonder of Nature: that God who made the gentle lamb made also the awful tiger of the jungle, with eyes of fire, and all the terrible power of limb and body. It is, indeed, a poem of that wonder which leaves us dumb before the great works of the Creator.

TIGER, tiger, burning bright
In the forest of the night!
What immortal hand or eye
Could frame thy fearful symmetry?

In what distant deeps or skies
Burnt the ardour of thine eyes?
On what wings dare he aspire—
What the hand dare seize the fire?

And what shoulder, and what art
Could twist the sinews of thy heart?
And when thy heart began to beat,
What dread hand form'd thy dread feet?

What the hammer, what the chain,
In what furnace was thy brain?
Did God smile his work to see?
Did He who made the lamb make thee?

LITTLE VERSES FOR VERY LITTLE PEOPLE

"WHERE are you going to, my pretty maid?"
"I am going a-milking, sir," she said.

"May I go with you, my pretty maid?"
"You're kindly welcome, sir," she said.
"What is your father, my pretty maid?"
"My father's a farmer, sir," she said.
"Say, will you marry me, my pretty maid?"
"Yes, if you please, kind sir," she said.
"Will you be constant, my pretty maid?"
"That I can't promise you, sir," she said.
"Then I won't marry you, my pretty maid!"
"Nobody asked you, sir," she said.

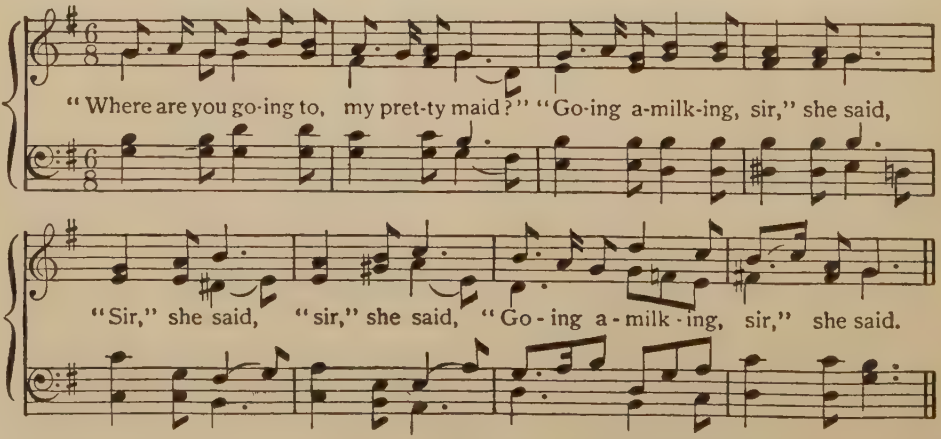
IF I had as much money as I could spend,
I never would cry old chairs to mend;
Old chairs to mend, old chairs to mend;
I never would cry old chairs to mend.
If I had as much money as I could tell,
I never would cry old clothes to sell;
Old clothes to sell, old clothes to sell;
I never would cry old clothes to sell.

TWO sticks and an apple,
Say the Bells of Whitechapel;
Old Father Bald Pate,
Say the Bells of Aldgate;
Maids in white aprons,
Say the Bells at St. Catherine's;
You owe me ten shillings,
Say the Bells at St. Helen's;
When will you pay me?
Say the Bells of Old Bailey;
When I am rich,
Say the Bells of Shoreditch;
When will that be?
Say the Bells of Stepney;
I do not know,
Says the great Bell at Bow.

WHEN little Sammy Soapsuds
Went out to take a ride,
In looking over London Bridge
He fell into the tide.

His parents never having taught
Their loving Sam to swim,
The tide soon got the mastery,
And made an end of him.

"WHERE ARE YOU GOING TO, MY PRETTY MAID?"



WHERE DOES AN APPLE COME FROM?

CONTINUED FROM 1086

WE know that when we sow seeds properly, they grow, and from a very small seed we may get a very big tree. It may be an apple-tree, and it may produce hundreds of apples, year after year. The question is, Where do they all come from? Or, to take another instance, we plant one pound weight of tomatoes, and we get a hundred pounds weight of tomatoes. Where does all the difference come from? It almost looks—does it not?—as if the hundred pounds of tomatoes were new weight in the world, just like the weight of the new apples; but we have said that the world scarcely gets any heavier, so that cannot be the truth. We are also quite certain that the stuff in the apples or the tomatoes is not made out of nothing, but comes from somewhere.

WHAT IS AN APPLE MADE OF?

The apple, then—and the same is true of the tomatoes—has been made by the wonderful power of the living apple-tree, out of the stuff which surrounds it. In the case of the tomatoes in the last question, we are quite sure that if we could have weighed the stuff taken as food by the first pound of tomatoes it would have weighed 99 pounds. The living creature—and this is true just the same of a growing boy or girl—takes from the world outside it everything that it adds to its own body. The earth as a whole is not any heavier, of course. Merely, in the case of the tree, some of the things that make up the weight of the air, such as oxygen, and the carbon from the carbon dioxide in it on which the plant feeds, and some of the things which make up the weight of the ground, such as water, and many salts in the water, have been built into its body.

DOES AN APPLE MAKE ITSELF?

It is as if you had a house that could build itself, and make its own bricks into the bargain. When the house is built, the earth is no heavier and no lighter than it was before. Merely part of the earth has gone to make a house. And so in the case of the apples or the tomatoes—or you. Part of the earth has been built into apples and tomatoes, and the builder in this case is the living plant. After a time—and this is true of every living creature—it dies, and the stuff which is taken from the earth and the air for making its body is restored to them, and other living ceatures use it in the same way; and so there is a circle or cycle, as it is called—the cycle of life—through which much of the stuff of the earth and air goes on passing from age to age.

THEN IS THE AIR LIGHTER IN SUMMER THAN IN WINTER?

It is true that in summer, apples

and leaves and all kinds of vegetable life are made partly out of the air, but I should not like to say that the air is lighter in the summer than in the winter on this account. In the first place, the weight of the air is so enormous that all the oxygen which is taken from it for the purposes of life would only be like a drop compared to the ocean; and, in the second place, there are many other things happening which might work in the other direction.

For instance, under the influence of the sun, many of the products of past life, lying on the surface of the soil, are broken up, and the oxygen they contain is given back to the air. So this question can scarcely be answered, except simply to say that all the changes between the earth and the air, vastly important though they are, and though all life depends upon them, yet deal with a mere trifle of the whole mass of the air, which is far more enormous than we can imagine.

Is the stuff in earth and air always changing places?

The answer to this is certainly yes, said the Wise Man, and if you had asked, "Is the stuff in the ocean and the air always changing places?" the answer to that would be certainly yes also. There is a ceaseless circulation going on between the surface of the land and the water, and the bottom layers of the ocean of air which covers them both. Wherever water is, for instance, it is often being sucked up in the form of a gas into the air, of which it then forms part; while, on the other hand, water vapor from the air often passes from it to the earth—as, for instance, in the form of dew. Then the gases of the air, especially oxygen and carbon dioxide, are ceaselessly passing between it and the bodies of all the living creatures on the earth; then, from moment to moment, various gases are either leaving the air to be dissolved in the ocean, or are leaving the ocean to join the air.

I sometimes think, said the Wise Man, that it would be well for us if we could mark an atom of oxygen, and watch it for a year or two, and see all the amazing things it does: passing in and out of the bodies of living creatures, in and out of the earth, in and out of the ocean. Then, if we remembered that all the other atoms of oxygen and of other things, too, were doing the same kind of thing, we should begin to understand how wonderfully alive, so to say, the whole world is. Perhaps the whole world, indeed, is really alive!

Is the world always the same weight?

The answer to this question is almost yes, but not quite. Year by year I think the earth gets a little heavier, because, while it probably loses little or nothing, it catches a few small things every year from the sky. These things are usually called shooting stars, and they have never belonged to the earth before, but as the earth moves through space it often comes across them and draws them to it by its attraction; so they are added to the earth, and so the whole earth is heavier.

We can see in museums all that is left of some shooting stars, though a good deal of them has been burnt away by the heat which is made as they rush through the air. Apart from this, the earth is always the same weight, for nothing can leave it, since its attraction keeps everything to it. It may possibly be that, as the earth turns, certain of the very light gases at the very outside of the air may be thrown away, just like the drops from a twisted umbrella; and we believe that the moon was once thrown away from the earth in this fashion, but that is all.

Why cannot we see the air?

The reason why we cannot see the air is that it is transparent, like glass—that is to say, it lets light go through it. It affects the light in some ways; for instance, light coming to the earth from a star is bent a little as it travels through the air, so that we never see the star where it really is. But directly we change one part of the air as compared with the air around it, so that it bends the light a little more or a little less, then we notice something.

In a sense you can see the air moving sometimes above a hot gas-jet. Also it is quite easy to change air so that you can see it in another way. We can make it cold so that it becomes like water, we can see it as you see water, and we can even freeze it so that it looks and can be seen just like ice. The air, fortunately, has no color in itself, so it does not alter the color of the light

passing through it—which would mean altering the color of things seen through it. Some gases have colors, yellow and green and so on, and if they are passed into the other gases which make the air they can be seen, or if you puffed some air into a bright yellow gas you would be able to see the air by contrast.

WHAT IS THE AIR MADE OF?

The air is a mixture of several gases, and these are all colorless and transparent. Among the gases in the air are carbon dioxide, which we give off when we breathe—and which is food for plants—and also a small amount of various other gases only found a few years ago. Most air also contains not a little water in the form of a gas or vapor. But all these taken together do not amount to very much. Very nearly the whole of the air is composed of two gases only; about four-fifths are made by a gas called nitrogen, which is very valuable to plants and therefore to us, and the remaining fifth is made by the wonderful gas, oxygen, by which we live every moment of our lives.

But I should not like to tell you what the air of crowded indoor places is made of, or even what the air is made of that you will find in a bedroom in the morning if only a single person has been sleeping in it all night with closed windows. This air is very different from fresh air or open air. It has the same things in it, but it has a great many other things; it has too much carbon dioxide and too little oxygen, and it has all sorts of poisonous gases which the sleeper has given off in his breath and from his skin. But when you asked me about air I am sure you meant open air, and we need say no more about foul air except to remember the great difference there is, and that thousands of people are killed every year by not knowing the difference.

WHAT IS IT INSIDE A CAT THAT MAKES IT PURR?

The noise a cat makes when it purrs is really a kind of talking, for it tells you that the cat has a certain kind of feeling. It feels pleased and happy, and it says so in its own way, and I have not the least doubt that another cat would know and understand what it felt, and very likely would feel pleased and begin to purr too, just as the company of happy people usually makes us happy. When a cat purrs, if you put your hand on it you can feel its whole body vibrating, or trembling. But when anyone speaks or sings—especially if he be a man with a voice low in pitch—if you put your hand on his chest you can feel him vibrate, or tremble, just like the cat. In the case of the man, we know that it is his vocal cords, as they are called, in his throat which he has set trembling, and they have set the whole of his chest trembling. I doubt whether anyone is sure what it is that the cat purrs with, but the cat has vocal cords just as we have, and we may be sure it uses them.

HOW CAN A DUCKLING SWIM WITHOUT BEING TAUGHT?

Here, again, as in some of the other questions, we have to say that the answer is partly instinct. It is only fair to remember that in any case it is very much easier for animals to swim than it is for us; and it is also fair to us to remember that some people do swim almost without being taught, and, indeed, that we should probably all be able to swim in a kind of way without being taught, even though our bodies are not at all suited for swimming, if it were not that a man who has not learnt to swim is frightened in the water, and throws his arms up, which is just as if he made his body heavy, and so he sinks.

Now, sometimes an insect, which has never seen anyone do the thing it has to do, does it perfectly. But in the case of the higher animals, like the cat and the duckling, the question of being taught comes in, if it be no more than merely by imitation. The kitten may partly learn to purr through hearing its mother purr, and the duckling, though perhaps its mother does not actually teach it anything, yet at least gets confidence from its mother. It knows she is there, and it sees that she can swim, and that helps it. I do not say that a duckling could not swim without being taught, because it could; but I think it would learn earlier with its mother's help than without it.

WHAT KEEPS THE EARTH FLOATING IN SPACE?

The answer to this question is that the earth is not really floating in space, but is moving. There is nothing floating in space. The sun and the moon and the planets are moving, we know. Men

used to think that the stars were fixed, and they called them fixed stars in order to contrast them with the planets, or wanderers. But the fixed stars are moving too; there is nothing at rest anywhere; nothing is floating in space, but everything is shooting through it. We do not know how these movements started, and we do not know how they will end, though we are just beginning to see order in them.

The real idea that we should have of the earth in space is not of a ball that is floating, but of something which is rushing round the sun, and which, if it stopped doing so, would in a few moments rush into the sun and disappear for ever; and also that the sun and the earth, and all the rest of the sun's family, are rushing through space at the rate of several miles in every second, no one knows whence, and no one knows whither.

WHAT KEEPS THE STARS IN THEIR PLACE?

Thinking people have been asking this for many ages, and you are quite right to ask it, but the question is not really a correct one. The stars are not kept in position, but are all in movement, and sometimes the stars *do* fall on to one another, we now believe. Astronomers now think that they can find in the heavens two great streams, to one or other of which all the stars belong; and these two streams are moving through and past each other in opposite directions.

No one has any idea at all how this process started, nor what the results of it will be, but at any rate we are quite certain that there is no such thing as what for so long has been called a fixed star, anywhere. Some people have thought that there may be a centre somewhere, which all the stars move round, but we cannot find any proof that this is really so.

WHY ARE ALL THE WORLDS ROUND?

It is true that all the worlds are round, or very nearly round, and that, if they are not quite round, there is a special reason. The earth, for instance, is not quite round, but bulges a little at the Equator, simply because it twists on itself so quickly that it gets a little out of shape. There is something special about roundness, for not only are all the worlds round, but a thing like a drop of water tries to make itself as round as it can; and if you drop melted lead from a height you get round shot. The reason is that in all these cases you have some force trying to pull all the parts of the world or of the drop towards each other. If this be so, the shape which the world or the drop will tend to take will be that particular shape in which everything is as tightly packed as it can be. That shape is the sphere, or, as you would call it, a round ball. If you all want to see a conjuror, and to be as near him as possible, what shape will you form round him? A circle, of course. The conjuror is a centre of attraction, like the centre of the earth or the sun, round which everything groups itself as near as it can, and so makes a round ball.

WHY DO WE GET TIRED?

We get tired for two reasons. The first is that when we do things we may use up the food stuff that has been prepared for use in our bodies. This very rarely happens, and is not the cause of ordinary tiredness, whether of mind or of body, which comes on though there is abundance of food supply still left to use. The usual reason why we get tired is that when we do things we produce substances in our bodies as a result of the changes which have gone on, and these substances are poisonous.

We now know that, even in tiredness after purely bodily work or play, it is the brain far more than the muscles that are tired. The brain is poisoned for the time by the substances made when the body is working. If a little of the blood of a tired dog is given to a dog that is not tired, it shows all the signs of fatigue, simply because the fatigue poison acts upon its brain just as much as if the dog had made it for itself by its own work. The heart is the most wonderful instance in the body of something that never gets tired. It beats without ceasing all our lives; but between every two beats it has a rest, and as long as we are well this rest is enough for it.

WHY DO I GET OUT OF BREATH WHEN I RUN?

We know that if we treat the heart properly it never gets tired. But if we run very hard, or swim very hard, or do anything of that kind, we suddenly

throw a great deal of extra work upon the heart. Now, so long as we are well, one of the most wonderful things about the heart is the amount of reserve power which it is able to call upon at a moment's notice. When we get out of breath we have already called upon this reserve power, and should take warning.

Boys at school sometimes make their hearts unwell for many months by running too hard races. When we run we use up a lot of air, just as an engineer uses much air in his furnace if he makes his train go quickly. Therefore, we need the blood to rush very quickly through our lungs, where it helps itself to the oxygen in the air which we breathe. So the heart beats more quickly, and at last it sends a message to the brain and makes us out of breath, as a warning. If we are wise we take the warning and stop to breathe; but foolish people sometimes will not stop, and I have seen boys and men faint after running races.

WHAT HAPPENS WHEN ANYONE FAINTS?

Fainting is really a very beautiful and wonderful thing. What happens is that the heart does not send enough blood to the brain, and so the brain stops working, and the person drops to the ground. Now, this is exactly what he needs in order to put him right. When you are standing or sitting up, your heart has to drive the blood upwards to your brain against the attraction of the whole earth, which tries to pull everything down. But directly the fainting person falls, the heart's task of sending sufficient blood to the brain is made easy, and so very soon his brain gets sufficient blood, and he "comes round," as we say. If his heart has not been actually strained he is all right again. So you see that the falling is Nature's method of "relieving the situation."

People who have not learnt this try to raise up the fallen person, which is simply interfering with Nature's beautiful way and putting his brain in the worst possible position for getting the amount of blood it needs. The right end of a fainting person to raise is his feet, so that little blood shall be wasted on his legs, and so that there shall be plenty to run towards his head, which needs it.

DOES THE BRAIN NEED FOOD?

The brain is made of nerves and nerve-cells. These taken together we call nervous tissue, and we know that nervous tissue is more richly supplied with blood than any other tissue in the body, not even excepting the muscle tissue of the heart itself. The blood carries the food materials without which nerve tissue cannot act, and nerve tissue has practically no reserve at all of food supply in it. If the supply of blood is stopped for a moment, nervous tissue "gives out" sooner than any other tissue in the body.

A simple and wonderful little experiment will show you this for yourself. The screen or curtain at the back of your eye, which receives the rays of light from everything you see, is made of nervous tissue. It is packed with blood-vessels. If you shut one eye and look out of the other, and then press your finger firmly on the open eye (pressing on it through the lid), in three or four seconds everything will grow quite dark. The eye is open and there is plenty of light, but it is quite blind. Move your finger away and in a second or two you will see again. The reason is that when you pressed on your eye-ball you prevented the blood running through the screen or curtain at the back of the eye, and after about two seconds, during which it was using up what it had taken from the blood, it could do no more, and your eye became blind.

HOW DOES A DOG KNOW A STRANGER?

A dog has wonderfully good eyes, but it has a still more wonderful sense of smell. Our own sense of smell is so very feeble and unimportant that only after we have made a long study of animals can we realize how useful and delicate this sense may be. Thus a dog "knows a stranger" chiefly because the stranger has a strange scent. If the stranger wore the clothes of the dog's master, then the dog would take him for his master, even though the stranger looked very different. After a time, very likely the dog might begin to feel uncomfortable, and act as if he thought something was wrong somewhere.

But, you see, every creature forms its judgments mainly by means of the particular sense which is best developed in it, and which it has therefore learnt

to trust best. We know people by our eyes, and though sometimes a man's voice may be exactly like the voice of a friend, yet we do not think that it is our friend if our eyes do not tell us so. Just in the same way the dog trusts his nose rather than his eyes, because his sense of smell is his best sense. Lastly, do not forget that it is because the dog has the wonderful thing called memory that he "knows a stranger." It is as if he said to himself, "This is not a smell I remember"—that is to say, it is a strange smell.

WHO WAS THE INVENTOR OF GUNPOWDER?

If this question had been asked our grandfathers or grandmothers, in their school days, they would promptly have answered "Schwartz, a German monk, who lived in the fourteenth century." The truth, however, is that no one knows. Some people say that the Chinese invented gunpowder and others say that Greek fire was made of the same materials as gunpowder, and that the Greeks used tubes, fixed in their galleys, to cast burning tow or flax into the enemy ships. Roger Bacon, an English friar, who lived in the thirteenth century, knew of gunpowder, though he did not of course give it that name, for he did not know that the force of its explosion could be used to cast missiles to a distance with deadly force. It is said that the Japanese used gunpowder and guns in a fight, at sea, with the ships sent against them by Kublai Khan, and that Kublai Khan used guns in his army. Early in the fourteenth century, the council of Florence used cannon to defend the city, and about the same time guns were used by Edward III in his invasion of Scotland, and also at the famous battle of Crecy. Some people think that perhaps Schwartz made improvements in guns and so the belief that he invented gunpowder grew up.

WHY DO THE LEAVES CHANGE COLOR IN THE AUTUMN?

In the autumn the beautiful green stuff made by the sunlight in the plant changes and goes. It is not that the plant is dying, but that it is going to rest for the winter, when the air is cold and the days are short. After all, many animals go to sleep all the winter, and for the same reason. *Hibernus* is the Latin word that has to do with winter, and so we say that some animals *hibernate*. Well, we might just as well say that many trees hibernate, and since they are not going to use their leaves, they take out of them everything that will be useful. In doing this the tree changes the green stuff in the leaf, and so we get various colors produced in the autumn. I think, said the Wise Man, that here is another thing which should remind us of the red stuff in the blood, for a drop of blood exposed to the air will change its color too, and so will a drop of blood under your skin when you have been bruised; and these colors are sometimes not unlike the colors in an autumn leaf.

WHY IS THE SNOW WHITE?

You might have asked also why is foam white when a wave breaks. In both cases we know that we are dealing with water, and yet, instead of being transparent, which means that it lets the light through, it is white. We understand at once when we find out what snow and foam are made of, or, rather, what is the state of the water that makes them. In the case of snow, the water is frozen and forms tiny little crystals of beautiful shape.

These all lie loosely together, forming the snow, and though, if you could take one of them by itself, light would go through it just as it will go through a piece of clear ice, or many other crystals, yet when you have a heap of crystals lying together, all turned different ways they throw the light back in all directions, just as salt does. They do not keep any part of the white light that falls on them, but throw it all back, and so snow is white. But, of course, if you have colored light falling on the snow, then the snow throws back that same color, and this gives some of the most wonderful sunset effects upon snow-covered mountains.

WHY IS FOAM WHITE?

Foam is made not of crystals of solid water, but of bubbles of liquid water, and the tiny bubbles do just what the crystals do. Between them they throw so much light back from their surfaces—just as a single soap bubble does—that they make the foam look white. Here, of course, the same thing is true—that the foam is white only when it is seen by a white light, such as sunlight.

If the light of the sun were green, then foam would be green, and snow too.

How do such big flowers come out of such small seeds?

This question is about something more wonderful, perhaps, than you think, for, indeed, the greater part of most seeds is not really necessary at all, but is just a supply of food material, and is not alive. The real seed from which the biggest oak springs is very, very much smaller than the smallest acorn.

The answer to our question can certainly not be that the seed has the power of making something out of nothing. A seed can no more make a tree out of nothing than a little child can grow into a big child if it is not fed. Just as Tommy turns his food into Tommy, so the seed of a plant, and the plant itself, turns its food into tree.

So the contrast between the size of the seed and of the tree is not really the most wonderful thing. The most wonderful thing is that the seed in its tiny space is made in such a way and with such power that it is able to turn the food it gets from the air and the ground into the very kind of tree or flower that its parents were. That is the mystery which hundreds of men of science are studying at this hour. It would not be so difficult if, when we see the seed under the microscope, we could see a perfect little plant, and if all it had to do was just to get big; but we see nothing like a plant in the seed.

Why do certain seeds come up at certain times?

Young creatures *come up*, if they are plants, or *are born*, if they are animals, usually at the time of year which is best suited for their particular way of life. That is the general rule throughout the whole world, both of plants and of animals; and the case of the seeds which come up in spring, some sooner and some later, according to the way they are made, is really only the same thing. I know only one exception to it, and that is ourselves. All the year round, little babies are born—Christmas Day and Midsummer's Day alike. The reason for this is that it does not matter what time of the year it is when a baby is born, because it depends unlike a plant, not upon the weather and the particular amount of sun that is shining or the particular amount of warmth in the earth, *but upon the love of its mother, and that is the same all the year round.* While, like all other living creatures, we depend partly upon the sun, and so on, yet more than all other things, we depend upon the care of those who love us.

Why are plants grown in the dark white?

The green stuff that we know so well in plants is made by sunlight, and it is made in order to use sunlight after it is made. Without it the plant can do little. If the plant is grown in the dark the green stuff is not made, and without it the plant is white. Now, when I think of the green stuff in plants, I also think of the red stuff in our blood. Though these two things differ in color and in the work they do, yet their use is very similar in both cases. They both contain iron, which has a way of giving color to almost everything it is found in. They both demand sun for their making, and if plants grown in the dark are white, so also are children grown in the dark. Their cheeks and lips and the insides of their eyelids, where their blood ought to show so well, are pale, because the blood that gives the color of health is itself pale, not having enough red stuff in it. It is cruel to grow children in the dark, but I fear there are millions of children who are grown in this way, and whose lives are spoilt for want of the red stuff, just as the plant's life is spoilt for want of the green stuff.

Why have we lines on our hands?

Some people have said that the use of these lines is to give us a better hold upon things, but if that were so we should have to say that they were scarcely worth having. It is much more likely that the use of these lines is to help the sense of touch in our hands and fingers, where touch is so very important. By making little valleys and ridges they increase the surface of the skin, and by going in different directions they help us to feel the kind of surface that anything has which we touch. The little endings of the nerves of touch are placed to the greatest advantage by means of these lines, and that seems to be the reason why they are so very well marked on just those parts of the skin where delicacy of touch is most important.

THE NEXT QUESTIONS BEGIN ON PAGE 1283.

THE SAD & BEAUTIFUL BRIDGE OF SIGHS

A world of sentiment has circled around the beautiful Bridge of Sighs at Venice connecting the State prisons with the Doge's Palace. But while its graceful proportions may call forth our admiration, we need not waste too much sentiment on the bridge, for probably no noteworthy or deserving prisoner ever crossed it. There is a copy of the bridge in Northumberland Street, London, near Charing Cross.

Venice, showing the Doge's Palace and the famous bell-tower, which fell in 1902, 800 years old.

THE MAKERS OF VENICE

CONTINUED FROM 1030

VENICE, the Queen of the Adriatic, is old, but age does not disfigure her. Our admiration and love for her increases as she grows older. She is very beautiful in her old age, and very pathetic. All her glories belong to the past. Venice is slowly decaying.

She stands like some beautiful vision upon the sands of the seashore, and men, as they see her image reflected in the gleaming waters of the lagoon, wonder if it be not some fairy fancy that they picture. Cities such as Venice seem to belong more to dreams and poetic visions than to this world of ours. Before asking who made Venice, we must for a moment recall the means by which this strange city came into existence.

Many hundreds of years ago, when barbarians overthrew the might of Rome, a small number of Roman descendants were driven before the conquering Goths and Lombards down to the coast of the Adriatic Sea. They hid in swamps and in the little islands formed near the coast. Many years passed, and the handful of people who had fled in terror from the Goths became noted as bold fishermen and sailors.

Each island was controlled by its own tribune, appointed by the people of the island, and each island was quite independent of the others. After two centuries, however, the people appointed one man a duke, or doge, to rule over them all, and they became rich and powerful. No longer did they fear attack from the mainland. They constructed bridges to join the islands together, and canals were made along the channels where the water had previously flowed unchecked. They built a powerful fleet, and this fleet they sent, in 827, to Alexandria, where it is said to have recovered and carried back to Venice the body of St. Mark. In honor of this saint the great Cathedral of St. Mark was built.

Venice became a crowded, wealthy, and important city. She sent out her soldiers and her ships with the Crusaders. She built up a great trade. She bought from the East and sold to the West. She bought from the West and sold to the East, and her own manufacturers became famous. She made conquests on the mainland, and she captured islands at sea.

Venice became one of the richest cities in the world. Her decline set in when America was discovered, and when the new route to India was found, as we read on page 65. After varying fortunes in war she eventually lost her independence, and is

now a part of the kingdom of Italy. While her citizens were so prosperous they had ample means for making their city beautiful. Her richest residents could not build great military castles, such as the barons of England and of Germany built. There would not have been room for them in Venice. So they built gorgeous palaces of marble. The Republic, as a body, could not build huge forts, for there was neither need for them nor space on which to erect them. So they devoted their money to erect the most splendid halls, council chambers, palaces for their rulers, museums, libraries, and churches.

VENICE, THE BEAUTIFUL CITY THAT RISES FROM THE SEA

They had very little space on which to build, for the city is made up of very many little islands, with the famous Grand Canal running like a capital S between them, and with over a hundred smaller canals, all bridged at frequent intervals. Therefore, as they could not have a city vast in size, they made one unequaled in beauty.

Her widespread trade brought her into relationship with all the civilized world, and she gleaned knowledge from them all. The fall of the Greek Empire sent the learned Greeks to Venice for refuge. They taught the Venetians all that they knew, gave them the treasures of the old writers, and so implanted a love of learning in them that it is to the Venetians that we owe some of our finest literature.

Great works which would have perished for ever were translated by them, and preserved for all the world. The Arabs, who were then among the masters of learning in the world, taught the Venetians how to make gunpowder and how to make glass, and taught them also the first principles of decorative art.

East and west, wherever they went, the Venetians were always learning. In Persia they learned the art of weaving costly fabrics, and gained there a knowledge of architecture.

THE MARBLE BUILDINGS THAT ARE THE GLORY OF VENICE

Their early building combined many styles, which included the elaborate fancy of the East with the sterner simplicity of the northern countries of Europe. But all was so beautifully blended together with a distinct Venetian style, that there was nothing to be found in the world quite like it. In their conquests they destroyed old buildings so that they might have the marble for their own city. They built the inner walls of their palaces and public buildings with brick, but they covered these with slabs of marble. They had not got good mortar, because it would not withstand the action of sea-water; they needed also marble.

One of their victories opened the way to rich quarries of red marble near Verona, and with this they were delighted. At about the same time the victory in Padua gave them possession of a hard lime which made mortar to defy the sea-water. These two little things show us how desperately anxious they were to improve their beloved city.

The building of St. Mark's Cathedral afforded work for doge after doge, and generation after generation, for hundreds of years. The square in which the wonderful cathedral stands was formerly a field with a canal running through it, and two churches were built within its boundaries. But these churches were pulled down, and the canal was stopped up to make way for the church built to receive the body of St. Mark.

ST. MARK'S CATHEDRAL, WHICH GREW BEAUTIFUL THROUGH THE CENTURIES

Wherever success attended the armies of Venice, or wherever religious men could buy, other places of worship were deprived of their treasure to enrich the walls of St. Mark's Cathedral. A good example of this we find in the story of the wonderful horses which decorate one end of the exterior of the cathedral. Their story is told on a later page.

For century after century the church grew; its shape was altered, its treasures increased, until in the beginning of the nineteenth century, the great Napoleon conquered Venice, and put an end to the whole work. It possesses one of the richest collections of church plate, and its retable, or altar-piece, called the Pala d'Oro—a marvelous piece of work in gold, jewels, and enamels, which stands behind the altar—is without equal throughout the world.

It is a picture of Christ, attended by archangels and angels and prophets; but the entire work is in precious metal or valuable jewels, and the most beautiful

THE SIGHT THAT NO TRAVELER FORGETS

The Cathedral of St. Mark at Venice, facing us in this picture, is one of the glories of Europe. It has been called the church that can neither be described nor forgotten, and a writer has said that its exquisite architecture makes one glad to be living in this world. As we gaze upon its splendid sculpture, the imagination is bewildered. The great bell-tower collapsed in 1902, but the rebuilding was begun three years later.

This picture shows us the other side of St. Mark's with the Doge's Palace on the right and the famous winged lion of St. Mark upon the column where he rests in lonely grandeur. The Doge's Palace is said to be the finest building in the world, and Charles Dickens has described it as "a palace more majestic and magnificent in its old age than all the buildings of the earth in the high prime and fulness of their youth."

enamel, through which the rich gold setting shines. It was brought from Constantinople in the year 976. The Doge's Palace is another of the wonders of the city, and it is not the less wonderful when we remember that it takes the place of an older building which was pulled down piece by piece to make room for the rising of the new one. It was begun in 1300 by a great doge named Pietro Gradenigo, but before it was finished 150 years had passed away.

THE DUKE WHO PAID A FINE THAT HE MIGHT MAKE VENICE BEAUTIFUL

After nearly a century had passed, the new building had been well advanced, but part of the old palace still stood. The Venetian Council decreed that things should remain as they were, and that anyone daring to propose any more building of the new palace should be fined 1,000 gold ducats. In spite of this, Doge Tomaso Mocenigo did dare to make the proposal. He paid his fine; the rest agreed, and they put the money into the building fund. The enlarging and beautifying of the palace began again in 1424, and did not stop until the work was finished.

It was in connection with this palace that the world-famous Bridge of Sighs was built, but it came more than a century later than the palace. It had been customary to have the State prisons on the ground floor of the Doge's Palace, but in 1588 the Venetians began to build new prisons on the opposite side of the canal, and the bridge was made to let the prisoners pass unseen along one passage in it from the prison to the palace, and back by another passage in it to the prison, where their miserable lives would end. The man who built that bridge built also the famous Rialto Bridge, and he was known as Antonio of the Bridge. The Rialto Bridge took him very nearly three years to build, and was finished in 1591.

THE FAMOUS BELL-TOWER THAT FELL AFTER STANDING NEARLY 800 YEARS

It is not easy to point to many notable architectural features of Venice and say that they are the work of such and such a man. Their building took too long, and engaged too many men in successive generations for that. Thus it was with the famous Campanile of St. Mark's, the magnificent bell-tower standing apart from the cathedral. This was ordered by Doge Pietro Tribuno, about the year 900, but not until 1131 was it finished. It was a noble piece of work, famous in all civilized lands. It stood 325 feet in height by 42 feet square. About 600 years passed away before the well-known great summit, or lantern, with its pyramid roof, was added. They built well in those days, for the Campanile stood until 1902, then, through gradual decay, it fell to the ground. The Venetians have since rebuilt it upon the old foundations.

One name stands out among these old-time architects which we must not overlook—the name of Fra Giovanni Giocondo, who was born at Verona, Italy, in about the middle of the fifteenth century, and died at Rome in 1514. He was a scholar and student all his days, as well as a gifted architect, and many famous men were numbered among his pupils. He traveled a great deal, and worked where he stayed.

Thus he built a fine bridge and a palace in Paris; he made a design for the building of St. Peter's at Rome, and he gave Venice some of her noblest palaces. It is sad to think that one of the most perfect products of his art, one of the smaller Venetian palaces, came in our day to be used as a wretched warehouse.

A GLORIOUS PALACE THAT WAS PLANNED IN THE MIDST OF WARS

Another of the men of this era was Michele Sanmichele, who was trained in the school of Bramante, a great artist, whom we meet among the makers of Rome. Sanmichele, like so many other men of artistic genius, was also a soldier, and the work of fortifying cities engaged in the wars of the period occupied more of his time than art. He managed to build some palaces for Venice, however, the time being about 1550. One of them still retains its glory. It was called the Palace of Grimeni, but is now used as one of the courts of justice, and remains a noble monument to the man who planned it amid wars and rumors of wars.

A greater architect than Sanmichele then arose in the person of Jacopo Sansovino, who was born at Florence in 1477, and lived in Venice from 1527 up to his death in 1576. Several churches stand to his credit in Venice, but the work which immortalized him was the building of the famous library of San Marco, and the Mint, which adjoins it. He built them at the same time, joining wall against wall, to form the most

THE GRAND CANAL, THE GLORY OF VENICE

The Grand Canal is one of the glories of Venice. A writer has spoken of its "serpent cunning" in reviving memories of the romantic past, and certainly, as we glide silently along the historic waterway in a gondola and see the palaces and other buildings on either side in which have taken place scenes of tragedy and glory in Venetian history, we realize something of the splendor and the romance of the days that have gone.

While in the picture above we see the most famous part of the Grand Canal, that which is spanned by the Rialto Bridge, once the centre of trade and commerce, in this picture we have another fine view looking across the canal to the Dogana, or custom-house, built in the 17th century. It is a beautiful scene.

The photographs on these pages are by Messrs. Alinari, Brogi, and Anderson.

striking contrast. The library, now called the Royal Palace, is one of the sights of the city—a building of great size in two stories, each supported by a series of arches of the greatest beauty.

Next followed a man to whom English architecture owes much. This was Andrea Palladio, who was born at Vicenza in 1518, and died there when sixty-two. He gave practically all his life to beautifying Venice. He built splendid churches and other edifices, but not palaces. He loved space for his work, and to rear buildings distinguished by dignity and simplicity. He went back to the best Roman style, and was the founder of modern architecture in Italy. He wrote on architecture, and his most important work came into the hands of Inigo Jones, one of the greatest of English architects, whom it greatly influenced.

We must leave the story of the architecture, and turn for a moment to the sculpture. This art in Venice remained chiefly a part of architecture. The architect was sculptor, too. The reasons were twofold. In the first place, the city clung to the examples of the East, which did not provide statues apart from buildings. In the second place, there was a strong desire to keep such open spaces as there were in Venice free from statues.

ANDREA PISANO, WHO TAUGHT VENICE THE IMPORTANCE OF BEAUTIFUL SCULPTURE

So little was the art of the sculptor encouraged that several of the doges in the Middle Ages were buried in tombs carved in the East hundreds of years before. However, Andrea Pisano, one of the great workers of Florence, set an example in the fourteenth century which Venetian sculptors were to follow. The seed thus sown grew slowly, but surely, and from Pisano's day the sculptural work of Venice became more important.

Instead of bringing sculptural decorations from other lands, as they had been in the habit of doing, the Venetians encouraged their own citizens, or, at any rate, men resident in their midst. The first sculptors of note were the Masegne family, who lived in the fourteenth century and the earlier half of the fifteenth century. Next came Pietro Niccolo, of Florence, and Giovanni di Martino, of Fiesole, who worked together and produced, among other works, a fine tomb for the doge who had insisted on continuing the building of the Doge's Palace. They had a fine wooden statue of John the Baptist, from Donatello; and Antonio Rizzo, who acted as one of the architects of the Doge's Palace, and also carried out important military engineering work, proved himself a gifted sculptor, only he ruined himself by dishonesty, and had to flee the city.

A GIFTED FAMILY OF SCULPTORS AND PAINTERS

Much excellent sculptural work was done by the Lombardo family—the Lombardi, as they are called. Not much is known of their history, though Lombardi works are numerous in Venice. The best known of the family was Pietro Lombardo, who died in the first half of the sixteenth century. He had three skilful sons, named Tullio, Antonio, and Giulio; and there were two other Lombardi known to Venice: Sante Lombardo and Moro Lombardo.

All the Lombardi were sculptors or painters. In the workshops of the Lombardi many other sculptors received their training, among them being Alessandro Leopardi, whose name is familiar to every visitor to Venice. Born in the latter half of the fifteenth century, he died about 1545, but his fame remains fresh. Two things make him always notable—the majestic flagstaffs which rise in front of St. Mark's and the work which he did in connection with the statue of Bartolommeo Colleoni, a famous soldier of Venice who lived in the fifteenth century.

Colleoni's deeds of war are of no account to-day; he is of no more importance to the world than if he had never lived, but he is of interest as having called forth a supreme work of art. He gained great wealth from the wars, and at his death he left all his money and horses and arms to the State, on the condition that they should raise a statue to his memory.

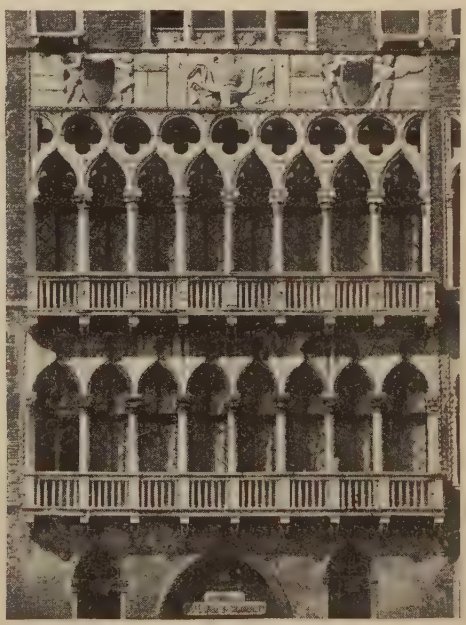
HOW A FORGER WAS CALLED BACK TO VENICE TO CAST A FAMOUS STATUE

The Venetians faithfully carried out their part of the bargain. Although Venetian sculpture was making progress, they could not trust one of their own citizens to do this work. They sent to Florence for Andrea del Verrocchio, who was famous as painter, sculptor, and goldsmith, and memorable to us as a teacher of Leonardo da Vinci. He

THE PALACES ON THE GRAND CANAL

Venice is the city of magnificent palaces, and it has been said of some of her larger buildings that they serve as a standard by which the ancient greatness of Venice itself may be measured. Men who could build on so splendid a scale had no thought of decaying fortune or declining power. This is the splendid Pesaro Palace on the Grand Canal. It was begun in 1679, and took more than thirty years to complete.

Here we see a part of the Doge's Palace, with the galleries so delicate that fairy hands might have fashioned them, and yet so strong that all the wear and tear of centuries has battered them in vain.



The Foscari Palace on the Grand Canal, the front of which is shown in this picture, is another of the glories of Venice, and a lasting monument to the men who made her beautiful in the days of her triumph.

was born in 1435, and was forty-four when sent for to make the Colleoni statue, which we see on page 4177. He—Verrocchio—had only nine years to live, and we might fancy that he realized that this was to be the last and greatest work of his life.

He devoted to the task all his strength and skill and art, but death overtook him before he could make the bronze casting of the statue of horse and rider. He finished the model and died. Venice had upon her hands the finest model of a horse and rider that had ever been made in the history of the world, but who was to cast it and set it up for all time? There was only one man—Alessandro Leopardi. But he had fallen into evil ways, and some years before had been driven from the city as a forger and criminal. In their need they recalled him, and told him to make the casting.

He atoned for his sin by the way in which he executed the task. He produced a splendid work from Verrocchio's model. The pedestal he modeled and made himself, and it worthily combines in every way with the horse and rider.

ONE OF THE NOBLEST MONUMENTS EVER SET UP ON THE EARTH

The statue is still without comparison. Horse and man seem alive. Mr. Ruskin thought it one of the noblest monuments ever set up on the face of the earth. Colleoni rides with defiant features, proud in his strength as a man, fierce and disdainful in his skill as a general. The horse moves heavily, but with great strength, as upon some dreadful battlefield. Leopardi was not satisfied with the fame which the pedestal gave him, but wrote his name upon the girth of the horse, as though the whole design were his. But nothing can rob Verrocchio of the honor of modeling one of the greatest masterpieces in the world.

But, after all, the great splendor and wonder of Venice belong to her paintings. There never was another place where such a glorious kingdom of pictorial art grew up. Venice is as supreme in this respect as she is for the beauty of her situation and buildings. Her supremacy was not soon won. For a long time she had painters of no special merit—men who painted, not in oils, but in distemper. These pictures were not like life, nor did they express any high ideal. It was just the bad old Italian art that they represented, dull, wooden-looking pictures done in churches and on the walls of other buildings. Then the Bellini family arose, and with them came new light. The glory of Venetian art dawned with them. They began to paint finely in distemper before ever the art of oil-painting had been heard of in Venice.

HOW THE GLORY OF ART IN VENICE DAWNED WITH THE BELLINI FAMILY

The improvement began with Jacopo Bellini, who was born probably about 1400, and died about 1464. Jacopo was a pupil of a famous artist named Gentile da Fabriano, a native of Fabriano, who died at Rome about the year 1428. Jacopo followed his master to Florence, where he met all the great men of the time.

He had two sons. The first, born in 1426, he named Gentile, after his old master. The younger son, born in 1428, he named Giovanni. Jacopo never became a great artist himself. His work was an improvement upon anything ever done before in Venice, but his chief credit is that he was the father of two notable sons, who carried out his own splendid ideas.

They worked together with him, and all the young artists of Venice who desired to become great in their art flocked to their studio to become pupils. Giorgione and Titian were of the number. Gentile Bellini painted scenes from the life of Venice; Giovanni Bellini painted religious subjects as Venice had never before seen them painted. Gentile painted portraits, and gained such fame that he was sent for by the Sultan of Turkey to paint his portrait at Constantinople.

THE SAVAGE ACT OF A CRUEL MAN WHICH DROVE BELLINI BACK TO VENICE

Gentile went and painted a famous picture of the cruel man who then ruled over Turkey. This wretch one day wished to show that Bellini had not correctly painted the head of John the Baptist after death, so he drew his sword and cut off the head of a slave standing near. So horrified was the artist that he never rested until he got back to Venice.

But a great change had now come over the art of Venice. An artist named Antonello, of Messina, appeared in Venice, taking with him a new art. He had learned from Hubert and Jan van Eyck,

TITIAN, THE POET-PAINTER OF THE WORLD

By many, the Italian artist Titian is regarded as the greatest painter the world has ever produced. It was the ambition of every monarch and prince of his time to be painted by Titian, and here we see the proud Emperor Charles V., on a visit to the artist, picking up the paint-brush which Titian has dropped.

Titian, here seen at work in his studio, has been called "the glory of a thousand years" and "the poet-painter of the world." His master touch makes the canvas glow with a warmth divine, and his "Assumption of the Virgin" is one of the finest paintings in the world. Titian lived in great magnificence at Venice.

the great Flemish artists, their secret of painting with colors mixed with oils. Let us look for a moment at a scene painted for the stage of a theatre; it is done in distemper, the medium in which the artists of Venice had been working. Then let us remember one of the glorious oil-paintings at the Metropolitan Museum, which is the kind of work that Antonello introduced. It set all the people in Venice wondering.

How the precious secret of painting in oils became known in Venice

The story runs that Giovanni Bellini went in disguise to Antonello to have his portrait painted, solely that he might learn for himself the great secret. Whatever the truth of this story, we know that the grand secret was soon mastered in Venice, and that the Bellinis were the first to help make it famous by their work. Venice was now glorified by many brilliant works of the brothers. They had the happiness, too, to see young artists promising to become even greater than themselves growing up about them.

But the Venetian authorities feared that death would come too soon and carry off Giovanni Bellini before his work for them was done. Though they paid very poorly for the work, they loved his art, and were determined to get as much out of him as possible. They therefore decreed that he should work every day in one of the great state apartments which he was decorating, and that he should have assistants.

These young men had only four or five ducats a month as payment, and the great Titian was one of the workmen appointed as painters on these terms.

How Venice treated the mighty Titian, and welcomed Albert Dürer

The document stating the terms of his engagement refers to him with as little ceremony as if he were a poor man called in to whitewash a ceiling. He became one of the greatest painters of all time. His story appears on pages 761-2. The mighty genius of Titian could never have developed in the way that it did had not Jacopo Bellini and his two illustrious sons given a new turn to the world of art.

Gentile Bellini died in 1507, nine years before his brother Giovanni. Both of them had the happiness to meet Albert Dürer, Germany's greatest painter. Born at Nüremberg in 1471, Dürer had a hard struggle for education. His father was a poor goldsmith with a family of eighteen children, and Albert had for a time to support his aged mother and a brother as well as his own family. He worked like a slave to master the elements of painting. His father, bitterly disappointed that the lad had wasted his time by years of study of the goldsmith's art, for which he had no love, at last allowed him to adopt painting as his profession.

There was little money for Albert in Nüremberg, but elsewhere others made money by copying his designs and selling the copies as his work. These pirated copies reached even Venice, and it was to prevent this dishonest trading in his productions, and to sell works which were genuinely his, that Albert, in 1505, went to Venice. His paintings astonished the Venetians. They were amazed at the skill with which he painted a picture for the German chapel in their city.

How Albert Dürer showed his genius by painting a lock of hair

The younger men were jealous. Not so the Bellinis. Giovanni went to Dürer as humbly as if he had been an apprentice, and asked to see the German painter's work. He could hardly believe that he had painted some of the things said to have been done. Giovanni asked to see the brushes with which the work had been carried out. Even then he could not understand, so Dürer picked up one of the brushes, and, while the aged artist looked on, painted a lock of hair so much like nature and so beautiful that it might have been taken from a human head and laid upon the canvas.

Giovanni was delighted, and praised and honored the young German, and gave him an order for his portrait. Dürer died at his home in 1528. A great painter and skilled engraver, he was also the father of etching, as well as one of the men whose art helped Venice forward in her efforts towards the glorious goal to which she was tending.

One of the first of the new school of artists to be influenced by the Bellinis was Vittore Carpaccio. He was born in Istria, about 1450, and lived seventy-two years. We have seen how the idea of painting scenes from *life* began to

MEN WHO MADE VENICE BEAUTIFUL

Some of the greatest painters the world has ever seen helped to make Venice beautiful, among them Albert Dürer, a German artist, seen here in his studio at Venice. He went to Italy to improve himself in painting, but the Italian artists learnt much from him. He painted a fine picture—"The Martyrdom of St. Bartholomew"—for St. Mark's, but this was later bought by an Emperor of Germany and sent to Prague.

Paul Veronese was one of the Italian artists who learnt much from Albert Dürer, and some of his best work is to be found in Venice. The frescoes painted by him on the ceiling of the Church of St. Sebastian are called by the Italians "the glory of Veronese." Here are two portraits of Veronese painted by himself. The first shows him as a hunter, and the other is from his great picture of "The Feast in the House of Simon."

take the place of pictures which had been painted again and again in the same flat old style. Carpaccio carried on the work in the noblest way. Some of the painters of his age took subjects from heathen books for their pictures. Carpaccio painted beautiful stories upon his canvases. His pictures told the story of the lives of saints and heroes; they were made to appeal to the mind and the soul, not, like some others, merely to the eye.

Like many other artists of that age, he was always comparatively poor, and we find a curious letter, written by him to a rich nobleman, describing a picture of Jerusalem which he wished to sell. The picture, he says, was 25 feet high and 5½ feet wide, and, in order that it could be inspected, he wished to send it to the nobleman, "rolled round a piece of wood." Fancy one of our artists having to send a picture to our Royal Academy rolled round wood instead of being packed flat!

A WONDERFUL ARTIST WHO DIED YOUNG IN A WONDERFUL AGE

Another great man arose in these days. Soon after the birth of Titian—that is, in 1477—Giorgione was born. As Giotto perfected the changes introduced by Cimabué, his master, into Florentine art, so Giorgione ennobled the art schemes of his masters, the Bellini family. Giorgione not only enriched the city by his wonderful frescoes and other paintings, but had a most powerful influence upon the artists of his own day—upon Titian among them, and upon the artists who followed. Unlike several of the men of his day, Giorgione did not attain a great age, dying, all too soon, when only thirty-three.

This was a wonderful age for Venice. Every rich man was willing to employ artists. They may not have paid well, but there was no very serious competition. And we find Giorgione, and Titian, and others, painting lovely works on articles of furniture, and other artists rivaling the goldsmiths in the splendor with which they decorated the outside of buildings with the glories of the brush.

Much talent was wasted in this way. Some of the artists would do anything for money. Titian was, perhaps, the most grasping of them all. We cannot but admire his works, but the nature of the man was in some respects detestable. This mean nature was never more apparent than in his treatment of another great man, Tintoretto, to whom we now come. His real name was Jacopo Robusti, and he was born at Venice in 1518, and died in 1594. His father was a dyer—a *tintore*—and so they called Jacopo, his son, Tintoretto, or Tintorettino, meaning "the little dyer." The clever boy was a born artist.

THE BOY WHO DAUBED THE WALLS AND BECAME A FAMOUS PAINTER

He used to dabble in his father's dyes, and to splash the colors all over the walls and furniture until his parents must have found him a nuisance. Seeing which way the lad's genius was inclined, the father took him to the studio of Titian. Jacopo's apprenticeship lasted but a few days.

Titian went into the studio one morning and saw, lying on the floor, papers covered with drawings. He picked them up, and asked who had done them. Little Tintoretto shyly confessed that he had. Titian saw that they were the work of a genius; he saw that this boy might soon become a rival to himself. He left the studio at once, and that same day had the poor boy turned out.

It was a shameful thing, but brave young Tintoretto was not to be beaten. His life became a miracle of activity. He set before himself two models—Michael Angelo for design; Titian, his cruel master, for color. Wherever he could see a work by either of these two he studied it. He copied antique statues. He made numberless drawings to perfect his style. He studied the human frame as a whole and in its various parts.

HOW TINTORETTO PAINTED PRICELESS PICTURES ON THE WALLS OF HOUSES

He made models of wax on which to hang draperies for the figures he meant to paint. He copied tombstones and bits of broken statuary. He studied the methods of every artist in every studio into which he dared to peep. He went down into the square where the poor painters worked who painted common furniture and cabinets for sale, and studied how they got some of their effects. He followed the work of architects. He used to beg builders to let him decorate houses which they were erecting. Once

he painted designs all round a clock which the builders were erecting in a tower. Another builder was putting up a new house, and Tintoretto insisted on painting the walls with lovely frescoes, simply for the cost of the materials he used. He would do paintings for chapels and churches and other buildings for practically nothing.

A MASTERPIECE THAT WAS PAINTED ON A CEILING IN A FEW DAYS

He did anything and everything to perfect his art and make his name known. He worked with marvelous speed, and, of course, the effect was not always good. But in time he made a very great name, and became one of the five greatest painters of all time. One story must suffice to show his passion for work and the marvelous way in which he carried it out.

The ceiling of the San Rocco School was to be decorated with a painting, and the artists of Venice were asked to send in sketches for the work. There were not many days for the preparation. The other artists made their rough plans. Not so Tintoretto. He had the space measured, and, with that zeal and speed which nobody could match, he painted his whole picture, and had it secretly fixed up on the ceiling and covered over.

When the day of trial came, the others showed their sketches, while Tintoretto stood by. At last he drew away the linen covering the ceiling, and the company saw his splendid picture already fixed.

Everybody was amazed. The authorities, when they recovered their breath, protested that they had asked only for designs, not for a finished picture.

THE WONDERFUL PAINTING THAT MADE THE AUTHORITIES OF VENICE ANGRY

The other artists, however, examined the work, and, seeing how great and exquisite it was, they withdrew from the competition. The authorities, however, were very angry indeed, and still grumbled furiously.

"Oh, very well; there is the picture!" said Tintoretto. "If you will not pay me for it, then I will make it a present to the saints."

After that the city authorities calmed down, and, deciding that the work was one of rare merit, they at last agreed to pay the artist fairly for it.

The last of the greatest Venetian painters was Paul Veronese. He was born in 1528 at Verona, whence his title, his real name being Caliara, or Cagliari. He lived in Venice from 1555 till his death, in 1588. His pictures were characterized by the brilliance of coloring proper to works of the great Venetian school, but he had caught the spirit of painters in Rome, and gave to his work more dignity, grace of pose, and ease of movement than had been possible before his day.

Paul Veronese was a painter more for the palace than the church. His scenes were scenes of splendor, of great space and riches and luxury, so that it has been said that one of his paintings would convert a garret into a palace of vast size and delight. He was a great worker, but different in type from Tintoretto, taking careful pains with all that he painted.

THE GLORY THAT HAS GONE FROM VENICE AND THE GLORY THAT REMAINS

In the Louvre at Paris there hangs his picture called "The Marriage Feast at Cana," showing no fewer than 160 portraits of people who lived in Venice in his day. The strange thing is that this painter of splendor and palaces should, like Tintoretto and Titian, have painted frescoes on the outside of houses which faded away and disappeared under the influence of the weather while the artists themselves were still alive.

With the death of Paul Veronese, the sun of Venetian art set. But the afterglow has lighted the world for more than three hundred years, firing the enthusiasm of all the artists who have lived since.

While the glory of Venice as a maritime power, holding a great part of the commerce of the world in her hand, and forming a link between the East and the West, is departed for ever, the more lasting glory which attaches to her as a patron of the highest and best art will never die. So long as Venice and her pictures last, they will remain the greatest treasures in the world, guiding and inspiring the artists who see them, and making our modern artists realize the influence which those beautiful and wonderful pictures have had upon the art of the whole world from the day that they were painted until the present.

THE NEXT MEN AND WOMEN BEGIN ON 1253.

SUNSET ON GOLDEN GATE

The beautiful entrance to San Francisco Bay is called the Golden Gate. The hills come down on each side leaving a passage one to two miles wide through which great ships from the Orient, from Europe, or from the Atlantic may enter the quiet waters of the bay. Few cities offer the traveler such an attractive introductory view. San Francisco Bay is a beautiful sheet of water which every one admires who sees it.

JOHN BUNYAN'S "PILGRIM'S PROGRESS"

WE left Christian proceeding bravely with his journey after he had won the fight with Apollyon, the Fiend of Darkness, who would have killed him. We are now to see what further adventures befell him on his pilgrimage from the City of Destruction—which means the sinful world of this earth—to the Celestial City, or heaven. The trials and troubles of Christian, Faithful, and Hopeful are just those which each one of us has to meet in our way through life, for Bunyan has made an entrancing story out of the life of any Christian man or woman.

THE PILGRIMS IN VANITY FAIR

THE FATE OF FAITHFUL, AND CHRISTIAN'S ESCAPE

CONTINUED FROM 1129

NOW, at the end of the Valley of Humiliation was another, called the Valley of the Shadow of Death. And Christian must needs go through it, because the way to the Celestial City lay through the midst of it. The pathway was extremely narrow. On the right hand was a very deep ditch. On the left hand was a very dangerous quag. Besides, the darkness was so great that Christian could hardly tell where, or on what, in going forward he should next set his foot.

About the midst of this valley, and near the wayside, was the mouth of the Underworld. Ever and anon flame and smoke would come forth with hideous noises. Christian heard doleful voices, and fiends came towards him. Near the burning pit one of the fiends came up softly to him, and whisperingly suggested many bad thoughts to him, which he verily believed had proceeded from his own mind.

When Christian had traveled in this disconsolate condition some considerable time, he thought he heard the voice of a man, as going before him, saying: "Though I walk through the Valley of the Shadow of Death, I will fear no evil, for Thou art with me." Then he was glad, because he gathered that some who feared God were in this valley as well as himself. Then the day broke, and Christian said: "He hath turned the shadow of death into the morning."

This was another mercy to Christian, for, from the place where he now stood to the end of the valley, the way was all along set full of snares, nets, and pitfalls. In this light, therefore, he came to the end of the valley.

Now, as Christian went on his way he came to a little ascent, which was cast up on purpose that pilgrims might see before them. Up there Christian, looking forward, saw before him Faithful, his fellow-townsman, of whom he had heard from the porter at the Palace Beautiful. Then said Christian aloud: "Ho, ho, soho! stay, and I will be thy companion!"

Then I saw in my dream that they went very lovingly on together, and had sweet discourse of all the things that had befallen them in their pilgrimage, and of what had happened in the City of Destruction after Christian had left.

When they were got out of the wilderness, they presently saw a town before them, and the name of that town is Vanity. And at the town there is a fair kept, called Vanity Fair; it is kept all the year long. Almost five thousand years ago there were pilgrims walking to the Celestial City, and Beelzebub, Apollyon, and Legion, with their companions in evil, perceiving that the pilgrims' way to that city lay through this town of Vanity, contrived here to set up a fair, wherein should be sold all sorts of vanity, and that it should last all the year long.

As Christian and Faithful entered into Vanity Fair, the people wondered

Copyright, 1908, by Amalgamated Press, Ltd.

at their apparel and at their speech. The town itself was in a hubbub about them. That which did not a little amuse the merchandisers was that these pilgrims set very light by all their wares. They cared not so much as to look upon them, and when asked what they would buy answered gravely: "We buy the truth."

The behavior of Christian and Faithful so little suited the people of Vanity Fair that the pilgrims were taken and examined, and those that examined them did not believe them to be any other than mad, or else such as came to put all things into a confusion in the fair. Therefore they took them and beat them, and besmeared them with dirt, and then put them into a cage, that they might be a spectacle to all.

Then some of the men in the Fair, that were more observing than the rest, seeing the patience of Christian and Faithful, began to check and blame the baser sort for their treatment of the pilgrims. Thus, after words had passed on both sides, the disputants fell to blows.

Then were these two poor men brought before their examiners again, charged with causing the hubbub, beaten, loaded with irons, led in chains up and down the Fair as an example and terror to others, and with threats remanded again to the cage.

A convenient time being appointed, they were next brought before Lord Hategood for trial. They were charged with injuring the trade of the town, and with causing commotions by winning a party to their most dangerous opinions. Evidence against Faithful was given by Mr. Envy, Mr. Superstition, and Mr. Pickthank, and, the jury finding him guilty, he was sentenced to the most cruel death that could be invented. They therefore brought him out, scourged him, buffeted him, stoned him, pricked him with their swords, and finally burned him to ashes at the stake. But a chariot and horses waited for him, and took him up through the clouds to the celestial gate.

As for Christian, he was taken back to prison, where he remained for a space, but He that overrules all things so wrought it about that Christian escaped them and went his way.

Christian, who is here dressed in his armor, and his new companion, Faithful, came to Vanity Fair, a resort of all sorts of wicked people, which is on the way to the Celestial City and must be passed through by every traveler. The two pilgrims were very shamefully treated at Vanity Fair, Faithful being put to death.

The jury that tried Christian and Faithful for disturbing the peace of Vanity Fair with their strange doctrines was composed of Mr. Blind-man, Mr. No-good, Mr. Malice, Mr. Love-lust, Mr. Live-loose, Mr. Heady, Mr. High-mind, Mr. Enmity, Mr. Liar, Mr. Cruelty, Mr. Hate-light, and Mr. Implacable. All these characters the artist tries to show in the faces of the jury; for one's face often indicates one's character.

CAPTIVES IN DOUBTING CASTLE

HOW THE PILGRIMS ESCAPED FROM GIANT DESPAIR

NOW, I saw in my dream that Christian went not forth from Vanity Fair alone, for there was one whose name was Hopeful—being made so by the beholding of Christian and Faithful in their words and behaviour in their sufferings at the Fair—who joined himself unto him and entering into a brotherly covenant, told him that he would be his companion.

Having passed over the little plain called Ease, and refused the invitation of one Demas that they should leave the narrow way to look at the silver-mine on the hill called Lucre, they came to a stile leading into Bypath Meadow.

The road that they had come by was very rough, and Christian, looking over the stile, saw that a path led along by the way on the other side of the fence.

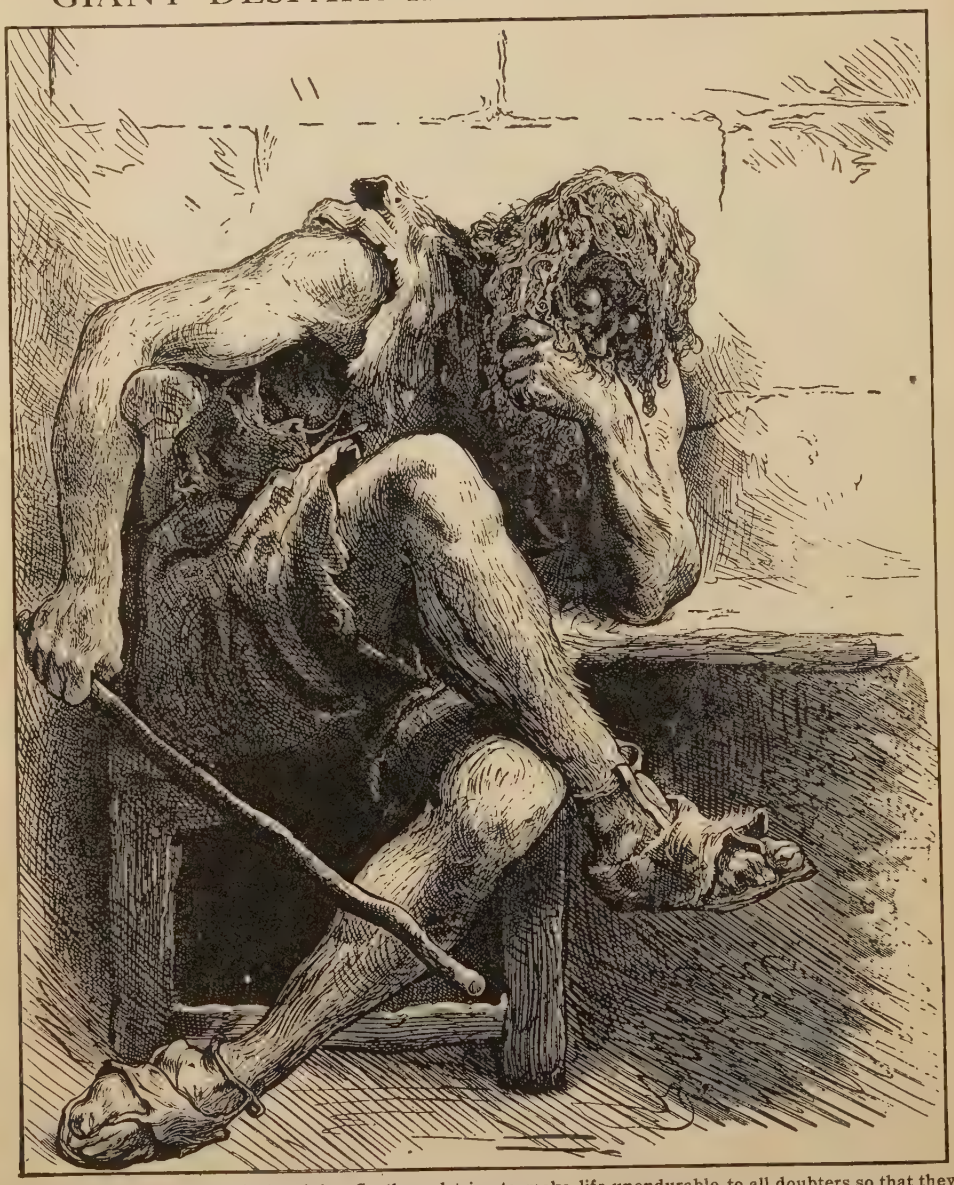
"Here is the easiest going," said Christian. "Come, good Hopeful, and let us go over!"

"But how if this path should lead us out of the way?" said Hopeful.

Christian remarking that it went along by the wayside, Hopeful was persuaded, and the two went over the stile, and found the path very easy for their feet. Presently the night came on, and it grew very dark; then it began to rain and thunder and lighten in a very dreadful manner. They saw they had lost their way, and Christian began to blame himself for bringing his companion out of the way.

But Hopeful comforted him and forgave him, and presently they were at rivalry as to who should go first, and so meet any danger that might lie in wait for them on the way back to the stile. By this time the waters were greatly risen, and the way was perilous.

GIANT DESPAIR IN DOUBTING CASTLE



Giant Despair, who lives in Doubting Castle and tries to make life unendurable to all doubters so that they may destroy themselves, failing which he kills them himself. Christian and Hopeful were happily able to escape from Giant Despair, as Christian had the key of Promise, which will open any Doubting Castle.

At last, lighting under a little shelter, after having been nearly drowned nine or ten times, they decided to rest there till daybreak. But, being weary, they fell asleep.

Now, near where they lay was a castle called Doubting Castle, the owner whereof was Giant Despair; and it was in his grounds that they were sleeping. And he, getting up early, saw them, bade them awake, and, driving them before him, put them into a dark and stinking dungeon of his castle, where they lay from Wednesday morning till Saturday night.

On the Thursday, acting on the counsel of his wife Diffidence, Giant Despair got a crab-tree cudgel, wherewith he beat them fearfully. On the next morning, again on the advice of

his wife, he came to them and advised them to make away with themselves. And when they prayed him to let them go, he rushed upon them, and had doubtless made an end of them himself, but that he fell into one of his fits—for he sometimes, in sunshiny weather, fell into fits—and lost for a time the use of his hand.

Towards evening the Giant went down into the dungeon again, and, finding that they were still alive, fell into a rage and threatened them so dreadfully that Christian's courage began to fail. But Hopeful comforted him by reminding him of the victory he had had over Apollyon, and how he had come through the Valley of the Shadow of Death.

On Saturday morning, the Giant, having had further counsel with his wife, had the prisoners into the castle yard, and, after showing them the bones and skulls of those he had already despatched, told them he would tear them into pieces within ten days. With that he beat them all the way back to the dungeon.

That night the Giant and his wife began to renew their talk about their prisoners; and the Giant wondered that he could neither by his blows nor his counsel bring them to an end. His wife replied that she feared they lived in hope that someone would come and release them, or that they had picklocks about them. The Giant at this resolved to search them in the morning. But about midnight on the Saturday, Christian and Hopeful began to pray, and a little before day Christian exclaimed:

"What a fool am I thus to lie in a stinking dungeon, when I might as well walk at liberty! I have a key in my bosom, called Promise, that will, I am persuaded, open any lock in Doubting Castle."

And he pulled it out. It opened the dungeon door, the outward door, and the iron gate.

The gate as it opened made such a creaking that it waked Giant Despair, who, hastily rising to pursue his prisoners, felt his limbs fail; for his fits took him again, so that he could by no means go after them. Then they went on, and came to the King's highway, and so were safe, because they were out of the Giant's jurisdiction.

THE END OF THE PILGRIMS' JOURNEY

HOW CHRISTIAN AND HOPEFUL REACHED THE CELESTIAL CITY

CHRISTIAN and Hopeful afterwards came to the Delectable Mountains. Here they were welcomed by the shepherds. The shepherds, whose names were Knowledge, Experience, Watchful, and Sincere, had them to their tents and gave them good counsel as to their way, and showed them through their perspective glass the gates of the Celestial City.

So they went on, and behold a man, black of flesh but covered with a very light robe, came to them, and, learning that they were bound to the Celestial City, bade them follow him, for it was thither, he said, that he was going.

Now, the name of this man was Flatterer, and by-and-by, before they were aware, he led them both within the compass of a net. Then in their distress they remembered the shepherds had warned them of the man.

At last they espied a Shining One coming towards them, with a whip of small cord in his hand. When the Shining One was told that they were poor pilgrims going to Zion, he rent the net, put them in the way again, and, having chastized them, bade them go on and remember the other warnings of the shepherds.

They went on till they came into a certain country, whose air tended to make one drowsy if he came a stranger into it. Hopeful was for falling asleep, but Christian remembered that this must be the Enchanted Ground, of which they had been warned. And so, to prevent themselves from falling into a sleep from which there was no awakening, they fell to good discourse.

In time they were got over the Enchanted Ground, and entered into the country of Beulah, whose air was very sweet and pleasant. The way lying directly through this country, they solaced themselves there for a season. Here they heard continually the singing of birds, and saw every day the flowers appear in the earth, and heard the

voice of the turtle-dove in the land. In this country the sun shineth night and day; wherefore this was beyond the Valley of the Shadow of Death, and also out of the reach of Giant Despair, neither from this place could they so much as see Doubting Castle. Here they were within sight of the city they were going to, also here met them some of the inhabitants thereof. And drawing near to the city they had yet a more perfect view thereof.

It was builded of pearls and precious stones, also the street thereof was paved with gold; so that by reason of the natural glory of the city, and the reflection of the sun beams upon it, Christian with desire fell sick. Hopeful also had a fit or two of the same disease.

But being a little strengthened, they went on, and as they went they were met by two men in raiment that shone like gold, also their faces shone as the light. These men asked the pilgrims whence they came; and they told them. Then said the men: "You have but two difficulties more to meet with, and then you are in the city." Christian, then, and his companion asked the men to go along with them; and they said they would. So they went on together until they came within sight of the gate. But betwixt them and the gate was a river, and there was no bridge to go over. The river was very deep.

Christian and Hopeful crossing the river to the Celestial City. When their faith was strong in the King of the Celestial City, so would they find the river shallow, and when their faith was weak the river would be deep.

The men that were with them, in answer to their questions, told them that they must go through the river, which they would find deeper or shallower as they believed in the King of the place. They then entered the water, and Christian began to sink, crying out to his good friend Hopeful: "I sink in deep waters; the billows go over my head."

Then Hopeful bade him be of good cheer, and had much ado to keep his brother's head above water. But after a while they both took courage, and Christian presently found ground to stand upon, and so it followed that the rest of the river was but shallow. Thus, they got over.

Now, upon the bank of the river, on the other side, they saw the two Shining Ones again, who there waited for them. Wherefore, being come out of the river, they saluted them, saying: "We are ministering spirits, sent forth to minister for those that shall be heirs of salvation." Thus they went along towards the gate.

Now, you must note that the city stood upon a mighty hill, but the pilgrims went up that hill with ease, because they had these two men to help them up by the arms. They had likewise left their mortal garments behind them in the river.

And I saw in my dream that Christian and Hopeful, after giving in their certificates, went in at the gate; and lo, as they entered, they were transfigured, and they had raiment put on that shone like gold. There were also those that met them with harps and crowns, and gave these to them. Then I heard in my dream that all the bells in the city rang again for joy, and that it was said to them: "Enter ye into the joy of your Lord."

So I awoke, and behold it was a dream.

. . . . .

But Bunyan dreamed another dream, and in this dream he saw how Christian's wife and children set forth from the City of Destruction, and, reaching the Interpreter's house, were put in charge of one Great-heart, who guided them to the Celestial City, whither Christian had gone before them. The story of this forms the second part of his great work: "The Pilgrim's Progress."

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 1223.

MARIE ANTOINETTE'S LAST SACRIFICE

HOW SHE GAVE HER LIFE TO SAVE HER CHILDREN

CONTINUED FROM 1061

THE King of France had been torn from the arms of his wife and children by the Revolutionaries. He had been driven through the crowded streets of Paris in a tumbril, the drums rolling, the soldiers armed—he had ascended the scaffold; the executioners standing there had seized him brutally, thrown him down under the knife, so carelessly that the falling blade had mangled him; and then, the drums rolling louder than ever, people shouting from the streets, the windows, and the housetops, the head of the king had been held up to the public gaze, and France was kingless.

In the great prison of Paris was a shivering group—Queen Marie Antoinette, her two children, and a sister of the dead king. The children clung to their mother. The king's sister looked at the widowed queen through tears. What would come next? Would the people of France rest satisfied with the death of King Louis? Or would they say, "His queen still lives, and his son, the son who is called by foreign nations King of France"?

The days went by slowly in the great prison. Discipline was a little relaxed. Friends of the queen were allowed to see her. Some of these friends were men of action. They knew the peril of Marie Antoinette. They knew also their own peril in being her friends. But they were brave men—all except one. The thought of this beautiful woman bowed under the dreadful knife of the guillotine was horrible to their souls. They determined to save her, the coward less earnestly than the others.

Now, in those days there was one spirit abroad more terrible than all the rest—the spirit of suspicion. France had got rid of her king; she was now a masterless republic; *and no man could trust his neighbour.* Panic took hold of the people of Paris. At a whisper that a man was sorry for the king's death, away went that man to the guillotine. Blood ran all day in the square called *Place de la Revolution.* Husbands were torn from their wives, sons from their mothers; no man was safe. It was the Reign of Terror.

And yet in this state of universal terror the friends of Marie Antoinette set themselves to rescue that unhappy lady from her prison, even the coward.

It was a bold, a noble, an utterly fine thing; such men deserve the homage of mankind, and we can find excuses for the coward. It matters not whether Marie Antoinette was worthy of such devotion; the thing that counts is the devotion of those friends.

They could not bear that she should die horribly in the public streets; to prevent it they would run the risk of

themselves being torn to pieces. There must have been times when even the coward forgot his fears.

So they laid their plans, and one day they came to the queen and unfolded the plan for the rescue of herself and her children. Then the coward started misgivings. The queen strove to stimulate him. He was a professor; he pointed out reasons for delay. His arguments were the very soul of logic. None who heard them could confute them. They were sound arguments. But there is that which undoes the most skilfully woven logic in the world —the tick of the clock. The professor argued; the clock ticked. The opportunity for rescue passed.

Foreign nations had declared war against France. Danton, one of the uncrowned masters of this new commonwealth, had made answer:

"The kings of the earth come up against us; we fling at their feet, as a gage of battle, the head of a king."

France was in arms. The nation rose to defend itself.

"What of the queen and her children?" asked the men of the Terror. The guards set in charge of Marie Antoinette were increased. Escape was impossible.

But without the professor the others went on. The danger to Marie Antoinette was greater now, far greater. The people were crying out for her blood.

"It is this Austrian woman who has brought war upon us!" they cried. "Down with the Austrian woman!"

Her friends said to each other:

"It is now or never!"

To save queen and children was out of all question. To save queen alone was possible. The plans were made ready. The risk was looked boldly in the face.

Then came the brave conspirators to the queen, and the proposal was made to her. She looked at them, not comprehending.

"Leave my children!" Haughtiness and defiance mingled in the mother's face as she regarded her friends. "It is impossible!"

But the sister of the dead king spoke earnestly to the queen that night.

"You are the only one threatened. For the sake of your children you should go. One day your son will be King of France; will he not need a mother at his side? And while you are in hiding till this tyranny be overpast, I, their aunt, will be a mother to your children. It is not for your own sake you should flee; it is for theirs."

Marie Antoinette listened and decided.

"It is well said; I will go."

That night the queen sat with her sister-in-law on the edge of the prince's bed. The boy was asleep. The mother looked at her child's flushed face laid upon the pillow.

Her daughter lay in a room adjoining, sleepless, the door open. The princess, lying there between slumber and waking, heard the voices of the Royal ladies.

"God grant," said the queen, looking down at her son, "that this child may one day be happy."

"Be assured, dear sister, that he will."

"Youth flies away, even as joy," said the queen. "There is nothing in life that lasts. Happiness has an end."

She got up from the bed, and began pacing the room. The little princess could hear the steps of her mother.

"And you, dear sister," said the queen, "when and where shall I ever see you again?" She paused. "No! No!" she cried. *"It is impossible! It is impossible!"*

That cry was the sacrifice of Marie Antoinette.

It meant, not that escape was impossible, but that to desert her children was impossible. The mother rose triumphant in her heart. Beyond the walls of the prison, beckoning to her and calling to her with songs, was liberty and fredom from terror. Here, on these guarded walls, deepened and darkened with every shifting of the clock's hand, was the shadow of death.

So this poor queen, who left her home, weeping and terrified, as a child of fifteen to become a wife in a strange land, who was weak and foolish and lived the vain existence of those about her—this poor weak queen, brought to decide between her own liberty and the desertion of her children, laid down her liberty, and went to the guillotine for the sake of her children. In this one act she was noble. Perhaps all through her life she might have been noble, too, if the call to her higher self had been as loud, clear, and certain as it was at that hour.

THE NEXT GOLDEN DEEDS ARE ON PAGE 1207.

WHAT THIS STORY TELLS US

WE learn here more about water, and how water, though it is not really an element, acts in the world as if it were an element. We learn how exceedingly important water is in the world, and how it forms a part of every living thing and of almost everything around us. Water is always being formed by living creatures, and the quantity of water in the world seems to be increasing. But we must never forget that water is not always in a liquid form as we drink it; if we could split up the things that make a cucumber into one hundred equal parts, ninety-five parts of the cucumber would be water; yet the cucumber is solid and has great strength. We read here how important it is for us that these things are so, and how the question of water comes into nearly everything.

THE GREAT MARVEL OF WATER

CONTINUED FROM P. 1033

WE have already said a good deal about water, and we have learnt that though the Greeks thought it to be an element, and though for long years after them it was thought to be so, yet it is not really an element, but a compound of oxygen and hydrogen, which are real elements.

Yet, though water is not an element, it acts in the world, for practical purposes, exactly as if it were the element which for so many ages it has been thought to be. The water already existing in the world—in the earth, in the bodies of living creatures, in the sea and in the air—goes on existing as water from year to year, just as if it were an element, and could be nothing else, just as lead and silver and other elements go on existing as lead and silver. Yet we know that water is not an element, but only a combination of other elements, and there is one important reason why we must always have it in the back of our minds that water, though it acts as if it were an element is not really an element.

This reason is that water is always being formed in some degree by the life of living creatures. The water that we breathe out from our lungs has not all come from water that we have previously drunk. Some of it is formed in our bodies by the burning up of the hydrogen which constitutes part of our food. Burnt hydrogen is hydrogen which has combined with oxygen, and that is water.

Thus there is going on in the world, so far as we can see, a very striking thing, and we do not at all know what will be the end of it. It seems as if we could not doubt that the amount of water in the world is increasing, because from year to year, in consequence of the activity of living creatures, more and more hydrogen is being combined with oxygen to form water, and the oxygen of the air is being used up.

While this is going on, there is, so far as we can see, little or nothing going on in the other direction, for water, once made, remains as water. Further, we have to remember that in all the processes of burning which we start for our own use, quantities of water are being made. There is hydrogen in coal, and especially in coal-gas, and when these are burnt water is made. Practically everything that we use for fuel contains hydrogen—wood, coal, gas, oil, and so on; and one of the products of their burning must be water. Things like petroleum contain great quantities of hydrogen, combined with carbon; and the amount of petroleum which is now burnt in the world every year is enormous. All the hydrogen in it leaves the carbon for oxygen, which it prefers, and forms water. Every motor-car in the world, as it goes along—except those which are run by electricity—burns fuels containing

hydrogen, such as petrol, and so more water is made.

At the present time there is more burning of fuel going on in the world than ever before. Great forests of trees that have been growing for ages are cut down and burnt. The *increase* in the burning of coal from one year to another is greater than the whole amount of coal burnt in a year not very long ago.

How water is for ever being formed by fire

Natural supplies of oil are treated in the same way. There is enough for what we need to-day and to-morrow; and not one person in millions cares to ask what our descendants will do, though it is absolutely certain that we are using these things up, just like a man who is living on his capital, and though it is equally certain that no new capital is being made anywhere for future generations to spend in the same reckless way.

But, for the question we are considering at this moment, the point is that the forming of water out of its elements is one of the constant results of the ever-increasing burning of fuel. Of course, if some other process were going on by which the water were split up without any trouble on our part, so that we could get the hydrogen back and burn it again and then again, and then again, all this would not matter. But there is no such process. That is why I have tried to lay such stress on the fact that in the world in general water, once made, remains water. It has been completely burnt, and can be burnt no more, and the power which was obtained in the act of burning it has been used and spent once and for all.

One of the biggest questions in the whole world

We must have this clear in our minds because, when you grow up, you will find that one of the biggest questions in the whole world will be this question of how to get power when the natural resources of the earth, such as coal and oil and wood, show signs of rapidly coming to an end. I have not forgotten electricity, nor the fact that, when an electric motor-car runs along, no hydrogen or any other fuel is being burnt up. But we are apt to forget that all the electricity which we use is only a special form of power, and all power has to come from somewhere.

Directly we ask where it comes from, we find that it was made by burning something—oil or gas—just as much as the power of a fire is made. If electricity came into use for every purpose, it would still have to be *made*, and the process of burning up the burnable things of the earth would not be stopped in any degree.

To sum up, then, in the general study of water, we can think of it as an element because, as it acts in Nature, it acts as if it were an element or a single thing which has always been and will always remain what it is. *But* we must never forget that it is really a compound, and there are two great reasons why we must remember this. First, because it is a great natural truth about one of the commonest things in Nature, and is therefore important in the understanding of Nature; and second, because the ceaseless consumption and burning up of the hydrogen fuels of the earth to form water which remains as water, and can be burnt no more, is one of the most serious and important facts of human activity at the present day.

The story of life and the story of the earth belong to one another

In another part of our book we are talking especially about life, but we must remember that Nature is a mighty whole, and that all the divisions of it, though they may be "natural" up to a point, are unnatural if they are carried too far. Water is not itself a living thing; it is made and exists and acts quite apart from the existence of life, and therefore we should talk about it here; but, on the other hand, it is closely connected with life and every form of living action. Life is lived in water, and water is actually formed out of its elements in all the activities of living matter, everywhere and always.

It is therefore impossible, you see, to keep these two subjects—the story of life on the one hand, and the story of the earth on the other—quite separate from each other. The story of life is really part of the story of the earth; the earth is the mother of all living. So here we may look at a series of clever pictures which tell us something about the amount of water found in various kinds of the products of life. If you ask where it came from in the things which the pictures show, the answer is not a

difficult one. Partly, the water in these things came into them as water from the outside world. They drank it, so to speak, just as we drink it. But also you can now understand that part of the water in the various living things or products of life which the pictures show was actually made by the power of life.

All these things are foods for us, and we are sometimes apt to think of them as if they were nothing else. But an apple, for instance, is a living thing which exists for itself as well as for us, and which, like every other living thing, requires food just as we do. Part of the water in the apple has been made in the apple, or somewhere in the apple tree, by the burning of the hydrogen in the food of the tree; that is to say, by combining that hydrogen with oxygen which the tree has breathed. Exactly the same thing occurs every moment in our own bodies, and in every other living creature.

THE PICTURES WHICH SHOW US HOW MUCH WATER IS IN OUR FOOD

Now for the pictures on page 1193. Each picture has at the side a tall pillar, which we call a scale, or measure, marked off into a hundred parts by little lines, and the thick black line in the middle shows how many hundredths of the thing in the picture are made of water. The principle is just the same as that of the scale on a thermometer, and on many other instruments. The pillar is really a little instrument that shows you the measure of water in the thing in the picture.

In the first picture, we are shown that eighty-two parts out of a hundred of apples simply consist of water. We have seen how the water comes to be there. The remaining eighteen parts of a hundred consist of various other things which are not water; and they, of course, are really the essential part of the apple. We usually borrow words from the Latin in order to express this way of measuring things. We take the Latin word for a hundred, which is *centum;* and a Latin word *per,* like "for"; and so we get the phrase *per centum,* usually written *per cent.* for short; and we say in the case of the apple, for instance, that it is 18 per cent. solid matter, and 82 per cent. water. The long black line in the scale in the picture tells the eye just what these words tell the mind. This way of showing things to the eye is very useful, not only for boys and girls, but for grown-up people too, and it is coming more and more to be used. It is called the *graphic* method of showing things, which means the *picture* method.

THE MYSTERY OF A CUCUMBER, WHICH IS NEARLY ALL WATER

Picture 2 shows that strawberries have only 10 per cent. of solid matter, and 90 per cent. of water. Picture 3 shows that the cucumber has only 5 per cent. of solid matter, and 95 per cent. of water. This is very interesting, for it gives us an instance of the wonderful way in which plants understand the principles of building.

If a man were set the problem of making something that would be as firm and feel as solid as a cucumber, and that would stand on end as a cucumber can, but were allowed to use only 5 per cent. of solid matter, and to make that support not only itself, but also nineteen times its own weight of water, he would succeed, I think, only if he were allowed to borrow from the plant world something which had already been made by it. I do not think he could do what was asked him by the aid of ordinary materials. In a word, the plant has learnt how to combine strength with lightness, as is shown in the light but strong frame of the cucumber. The same thing might be said about the strength of the threads of the spider's web, or of the threads of silk made by the silkworm.

THE LITTLE THINGS THAT THE WORLD'S GREAT BUILDERS MARVEL AT

Again, none of the clever people who study the question of lighting, and who invent all sorts of lamps, are able to get as much light out of a given amount of power as the glow-worm does. They have to waste a great deal of their power. Or take one more instance. There is nothing on which men have spent more thought and experiment and labor than in making machinery; and they are always trying to get the utmost power out of the machine in proportion to its weight. But no machine ever made nearly approaches the living machine we call a muscle in this respect.

Thus, the cucumber, the spider, the glow-worm, and any creature that has

muscles, teach us that in matters of building and supporting and lighting and machinery—not to mention any number of others—life is more wonderful than we can imagine until we begin to look at it closely. It never disobeys the laws of matter and of power; it never makes anything out of nothing; it obeys, as it must obey, all the laws which we must study in our story of the earth; but it uses them with skill which has no rival even in the cleverest work of men. The cucumber, then, directly we examine its composition, is seen to be a miracle of lightness and strength, and a thing for every builder or maker of things for human use to marvel at.

Picture 4 is very interesting to compare with picture 3. It shows us that milk contains 87 per cent. of water and 13 per cent. of solid matter. Milk is thus less watery than the cucumber, but the cucumber can stand upright and milk cannot. In another part of this book we have to say a great deal about milk, but here we may consider for a moment how all-important is the question of *structure* in deciding whether matter shall be liquid or solid, whether it shall flow wherever it can or shall stand upright.

WHY A SPIDER'S WEB IS STRONGER THAN STEEL

If it were merely a question of how much water there is in a thing, and if there were nothing else that mattered, the milk would stand upright without the glass, and the cucumber would run all over the table if you made a hole in its skin. Yet the solid matter in the milk is more than in the cucumber; but the parts of it are not built or jointed to each other.

This shows us how strength of structure is obtained by proper union of parts. In building a bridge, for instance, it is not the mere weight and strength of the materials in themselves that makes them strong, but the way in which they are arranged and joined together. There would be more stuff in a rope of sand, if we could make a rope of sand at all, than there is in a spider's thread. But we cannot have a rope of sand because the parts of sand will not join to each other; while a spider's thread is stronger than a steel thread of the same weight because its parts are better joined together.

Strength, then—the power of holding together, the power of resisting destruction—is a question of *union of the right kind* rather than of the character and amount of the things united. Union is strength, as we say, and the common illustration of this is that while we can break one stick across our knee, we cannot break a faggot of sticks all at once; but the proverb has a far finer meaning than that illustration suggests.

WHERE THE REAL STRENGTH OF A STRONG THING COMES FROM

A strong enough man could break many sticks all at once; but if those sticks, instead of merely lying side by side, had all the matter, or stuff, in them rearranged and united in the best possible way, then it would require many men to break them. The faggot of sticks just has the strength of one stick added to that of another stick, and so on; but the really strong things in the world, spider's threads, a cucumber, a strong nation, or anything else, have far more than the strength of their individual parts merely added together. Real strength comes from the fitting of one thing into another, as the parts of the spider's thread are fitted to one another, or as the atoms of solid matter in the cucumber are built and fitted into one another, or as the duties and powers of men and of women, of old and of young, of thinkers and of doers, are fitted together in a strong and happy nation, and as they will be fitted together some day in happier and wiser nations than the world has ever yet seen.

Who would have thought there was so much to be learnt from a cucumber? The answer to that is that we can learn the greatest lessons from the smallest things if we try; whilst if we do not try we cannot learn even the smallest lesson from the greatest things.

THE GREAT LESSON THAT A LOAF OF BREAD TEACHES US

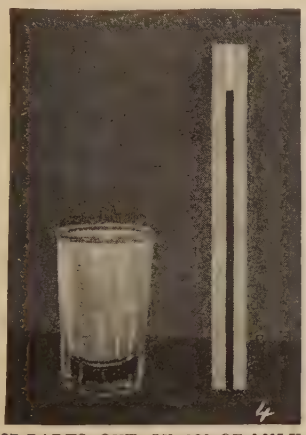
Picture 5 shows us a bag of flour which has only 12 per cent. of water in it; this leaves 88 per cent. of solid matter, the greater part of which is fit for food. But a point we may notice here is that, though the flour is nearly all solid, it will not stand up by itself, but needs a bag to hold it up. Compare that with the cucumber, which is nearly all water. The parts of the flour are not built into each other.

THE WATER THAT IS EVERYWHERE

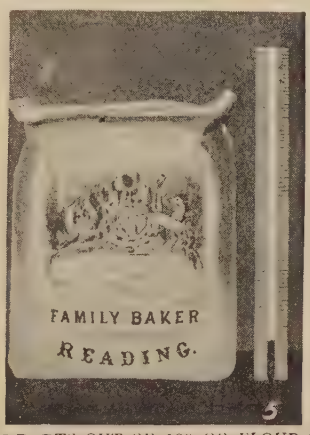
82 PARTS OUT OF 100 OF APPLES ARE MADE OF WATER

99 PARTS OUT OF 100 OF STRAWBERRIES ARE MADE OF WATER

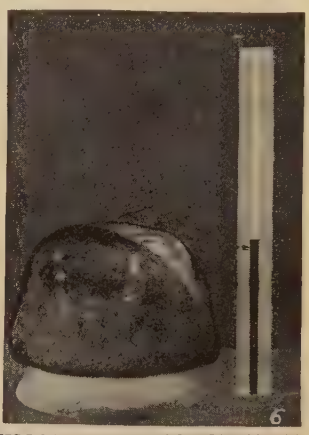
95 PARTS OUT OF 100 OF A CUCUMBER ARE MADE OF WATER



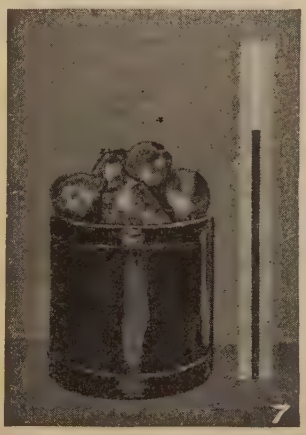
87 PARTS OUT OF 100 OF MILK ARE MADE OF WATER



12 PARTS OUT OF 100 OF FLOUR ARE MADE OF WATER



THIS LOAF CONTAINS MORE WATER THAN THE FLOUR BESIDE IT



THREE-QUARTERS OF A POTATO IS MADE OF WATER

ABOUT TWO-THIRDS OF AN EGG IS MADE OF WATER

ABOUT FOUR-FIFTHS OF A SOLE IS MADE OF WATER

These pictures show us how water comes into everything. It is wonderful to think that a cucumber can hold together as a solid thing, although 95 parts of it are water and only 5 are solid matter. It is as if a man were given 95 glasses of water and 5 glasses of something solid, and told to make one solid thing out of them. Each of these pictures has a little measure beside it, marked off into 100 parts by little lines, and the thick black line shows how many of these parts are made of water. The black line up the centre of the scale stands for the water, the white line stands for the solid matter in all these things.

Picture 6 shows that when flour is made into bread, something happens to it which makes its parts fit into, or rather stick to, each other, so that a loaf will stand by itself, though it contains much more water than flour does. This teaches us the same lesson again, you see, that union, and not the mere denseness of a thing, is strength.

Picture 7 shows us potatoes, which are just about three-quarters water, and about one-quarter solid matter. This one-quarter, however, is valuable as food.

Picture 8 shows that an egg contains less water than a potato. Roughly speaking, an egg is two-thirds water and one-third solid matter. A sole, shown in picture 9, is nearly four-fifths water.

One general lesson we learn from this series of pictures, and it is that water is found in a high degree in nearly all the products of life. Of the things shown in the pictures, dry flour contains least water, and that is a product of life which has been prepared by man and has lost most of the water that was in the part of the plant from which it was made.

THE GREAT DIFFICULTY OF GETTING RID OF ALL THE WATER IN ANYTHING

But though this particular set of pictures deals with products of life, we must clearly understand that some quantity of water is found almost everywhere. Only by taking the very greatest trouble, and by using great skill, can we obtain a sample of air which has no water in it. I mean, of course, water in the form of a gas.

In the same way great trouble is required if we want to get any solid thing that is perfectly free from water—perfectly dry, that is to say. Water has a way of sticking to almost everything. Sometimes, for special purposes, it is necessary that something men are working with shall be perfectly free from water—a piece of glass, for instance, or many other things in making experiments. We can easily get rid of 99 per cent. of the water; but it is very hard to get rid of the last traces.

Often, then, men use certain substances which have a special liking for water, and will help themselves to all the water that is near them. One of these substances is alcohol, and thus alcohol, though it is a liquid, and wet, is often used in order to *dry* things—that is to say, in order to remove the last traces of water from them! That is all very well; but if for any purpose we want to have a sample of alcohol without any water in it, the case is a very difficult one. I believe that, in spite of all their skill and trouble, chemists have never yet been able to obtain a sample of alcohol which was completely free from any proportion, or percentage, as they say, of water.

THE GREAT POWER THAT WATER HAS OF CHANGING THINGS

We must now leave water for the present, but we must have firmly in our minds the idea that water is practically everywhere—whether we can see it or not, whether things feel dry to our fingers or not. We shall realize the great importance of this in a thousand ways if we remember that there are very few things in the whole world of which a little, at least, cannot be melted in water. This means that wherever even a tiny quantity of this wonderful compound is, it dissolves, or melts, in itself, almost always, at least a little of the matter that is around it.

Throughout the whole world water is the means of change by its power of melting things, and so altering their state. This is the kind of idea which was expressed long ago in the words, "constant dropping wears away a stone," words which are far wider and more generally true than we might suppose if we simply accepted what they said, and thought no more about it.

A WORLD WITHOUT WATER WOULD BE A WORLD WITHOUT LIFE

A world without water would not only be a world without life, but it would be in countless ways utterly unlike the world we know, quite apart from the question of life altogether. Thus if we were to say here *all* that there is to say about water, we should find it necessary to explain nearly all that is known about the story of the earth and about the story of life, because the question of water comes into very nearly everything.

Yet water is not an element, and now, though we shall have again and again to refer to water, we may go on to the study of the elements of which it is composed, beginning with hydrogen.

THE NEXT STORY OF THE EARTH BEGINS ON PAGE 1243.

WHAT THIS STORY TELLS US

WE have let our eyes travel over the world of life—life, which is the most wonderful thing we know; life, which enables us to know at all. Yet, though life is so varied, wherever we turn we find that every kind of living creature is made of living cells, together with the products of those cells, such as shells and hair and wood; and, lastly, we find that all living cells are made of the same thing, which we call protoplasm. Protoplasm is the most wonderful thing in the world, because it is the abode of life; and we cannot know too much about it. For fifty years wise men have been studying protoplasm, what it is made of, how it is built together, what it must do to live, what its life consists of, what happens to it when it dies. In these pages we read what men have learned of this wonderful basis of all life.

WHAT LIFE IS MADE OF

CONTINUED FROM 1123

WE have been reading of "the *living* part of all living cells." If I had not specially said *living* you might have asked me whether the cell-wall of plants is made of protoplasm, though I told you that its name was cellulose. But you see that the living cell can make out of itself, and by its living power, all kinds of things that are not themselves alive. Cellulose is not alive; it is not made of protoplasm, but it is made *by* protoplasm.

The tip of your nails is not alive; it is a horny stuff made by the living protoplasm of the skin-cells at the base of the nail. The outside part of our teeth is not alive; it is, or should be, a hard and almost stony thing, with no feeling in it and with no water; but it was made by soft living protoplasm. The woody stuff that gives the oak its strength is not alive, but it is made by the living protoplasm of the wood-making cells of the tree. The quills of a porcupine are not alive; the feathers of a bird are not alive; but they are made by the living protoplasm of those cells in the body of the porcupine and the body of the bird which have the power and the duty of doing these extraordinary things.

In many cases a living cell, made of living protoplasm, becomes gradually changed, as a whole, into a lifeless substance, for the sake of the body to which it belongs. Every time you wash your hands you rub away millions of tiny skin-cells which have gradually grown outwards from the deeper layers of the skin, being pushed outwards as new cells were formed beneath them, and which, by the time they reach the surface of the skin, have lost all their living protoplasm and joined together to make a lifeless waterproof covering for our bodies. Yet under the microscope we can see clearly that this covering, the outside of which we rub off when we wash, is made of these changed cells that were once alive.

Now, before we go on to study the nucleus of the cell, to see how it is made, and to see the astonishing things it does when the cell grows, we must say a great deal more about protoplasm.

This is really the greatest question in the world. There are some lines by the great English poet Tennyson which are often quoted, but which very few people know the great meaning of. Here is the whole of the little poem, and I want to explain it to you now, so that, however long you live, you will never forget how much it means.

Flower in the crannied wall,
I pluck you out of the crannies.
I hold you here, root and all, in my hand,
Little flower; but if I could understand
What you are, root and all, and all in all,
I should know what God and man is.

Now, anyone who ever thinks at all can read this little poem and make sense out of it, as we say, but it is one thing just to make sense out of it, and another thing to get the real, deep meaning out of it. I will tell you what that meaning is. The little flower is a living thing—that is the point. And since life is similar, even including human life, then if we could understand the flower "all in all," we should understand what all life is.

THE WONDERFUL SECRET OF LIFE THAT WE CAN NEVER KNOW

The great universe in which we live is a mighty whole. There is nothing in it common or unclean or not worth considering. A flower may be a little thing; it may only flourish for a day or two, and then it seems to be gone, but the key to its life would be the key to the riddle of the world. We do not possess that key.

We shall read together all we know about the living protoplasm which makes the flower and all other living creatures. But all we know, and all that anyone knows, is far short of all that God knows about the flower; and here we must think of one of the most important and greatest things that anyone can ever think of — something which a child can understand, but which the wisest of grown-up men and women cannot do more than understand. It is simply this: It matters much less, a million times less, that we should find out the secret of the flower, the secret of protoplasm, than that we should know there is a secret, and who holds the key to it.

You may go through the world and be very clever and find out many things, and the more you learn the better pleased with yourself you may be, and yet you may all the time be only a fool compared with the wise person who knows that all that we know and can know is nothing compared with what God knows.

THE SPIRIT IN WHICH WE MUST TRY TO UNDERSTAND LIFE

I will try to put it another way. It is better for us that we should be reverent even in the presence of a little flower, knowing all that the flower means, though we cannot understand it, than that we should be able to make living flowers out of dust and water and have no reverence.

Well, then, let us remember these things and keep them always at the back of our minds, and then we shall be prepared in the right spirit to study protoplasm, the temple of life — life which we see around us, and which we feel in ourselves, which we can never fully understand, but which it is better to reverence without fully understanding than to understand without reverence.

We must try, then, to pull protoplasm to pieces, but to do it in the right spirit. There are foolish people, though they know so much, who try to pull protoplasm to pieces, and try to study all Nature, just as a boy may pull a watch to pieces or tear a flower to pieces. They simply want to know how the thing is made, just as one wants to solve a puzzle. But there are other people, and boys, too, who may learn to take a flower to pieces or a watch to pieces, or to study the air or the earth or the stars, not merely for the amusement of trying to solve a puzzle, but in a very different spirit, which can be explained best in the words of one of the greatest men who ever lived.

WHAT KEPLER WAS DOING WITH HIS TELESCOPE ON THE HOUSE-TOP

His name was Kepler, and his particular study was the stars; but you have wisdom enough already to understand that what he said would be just as true if he had been studying a flower or anything else in the whole of Nature. On the roof of his house, watching the heavens through his telescope, he was a long time away, and when he came back to his friends he was asked what he had been doing.

Now, a stupid man might have said, "I have found out how the planets move." That was not Kepler's way of putting it. He said, "I have been thinking the thoughts of God after Him." Now, that is what we are to feel in all our study of the wonderful world around us and within us. We may measure the movements of the planets, or the sun, or the stars in our study; we may pull a flower to pieces; we may examine protoplasm under the microscope, and make experiments with it; but we are to remember all the time that we are *thinking the thoughts of God after Him.*

Protoplasm, which has often been called the basis of life, is the living stuff found in every living cell in earth and sea and sky; in the microbe, the moss, the mouse, or the man. Now, we have

already learnt in another part of this book that all matter is made up of various kinds of elements, such as carbon, silver, oxygen, and so on.

The first thing, then, that we have to ask about protoplasm is, What elements does it contain? The answer to this is certain. Protoplasm is made up, *somehow*, of certain elements which we are perfectly familiar with in the world in general. Nor are they even rare elements, but they are amongst the commonest and most widespread of all the elements that we know. This is a very important fact. Even the most wonderful kind of living cells there are—the nerve-cells of the highest part of the human brain—are made up, so far as their elements are concerned, of the stuff that is all around us everywhere.

TWO OF THE THINGS THAT MUST HELP TO MAKE PROTOPLASM

We must notice exactly what the elements found in protoplasm are. Two of them, at any rate, we know already, for we know that all protoplasm contains water, which is made of the elements oxygen and hydrogen. It would be more correct to say that protoplasm is contained in water, rather than that protoplasm contains water. Live things cannot live without liquid water.

We have lately learnt, however, that this statement, which is quite true, is not quite the whole truth. It must not be taken to mean, for instance, that if a living thing is frozen, or if it is made quite dry, it must die. That is not so. In these cases the living creature stops living *always*, but it does not necessarily die; it stops growing, it stops breathing; it shows none of the characters of life, which are only shown in the presence of liquid water.

THE FIVE GREAT ELEMENTS THAT ARE NECESSARY TO ALL LIFE

Yet, though it cannot be said that it is living, it still has in it the power to live if it gets liquid water; it cannot be called living, and it cannot be called dead. At any rate, we understand that the processes of life do not go on except in the presence of liquid water, and it is probably right to say that liquid water is one of the things which make protoplasm.

Besides the oxygen and the hydrogen of the water, in which all protoplasm lives, there is a great deal more of both oxygen and hydrogen in it; not combined together, however, to form water, but combined in different ways with various other elements, and with each other. The elements invariably found in protoplasm, elements without which protoplasm cannot exist, are *carbon*, *oxygen*, *hydrogen*, *nitrogen*, and *phosphorus*. We cannot be perfectly certain whether sulphur is not necessary for protoplasm; but we are sure that there can be no protoplasm without the five elements I have named. They are all common elements, and there is nothing rare about any of them. Living protoplasm could not be spread through the world as it is if the things it needs for its life and for remaking itself as it goes on living were not to be found almost everywhere. Life then exists by virtue of common things.

Now, if we have got that clearly understood and remembered, we can go on to another great fact which must always be remembered along with it. It is that whilst, on the one hand, the elements of protoplasm are common and familiar, the ways in which they are combined together in protoplasm are wholly unlike anything else in the world.

THE GREAT POWER OF PROTOPLASM TO MAKE NEW THINGS OUT OF OLD

You remember, I am sure, that what we call the elements often combine with each other to form what we call compounds. The simplest instance is the compound water made by a combination of the elements oxygen and hydrogen; and water, we have said, is found in protoplasm. But the compounds of which protoplasm is really made, though they are compounds of familiar elements, are utterly different from any compounds found anywhere else. This, then, is the power of protoplasm, to take common, ordinary things, and make them, as it alone can, into things which are utterly new and different. Poets do this with common words. The great composers of music do it with sounds that are at anyone's disposal; life does it with the common elements of the world, building them into protoplasm, out of which are built the bodies of all the varied and beautiful living creatures that live, and have lived, and are yet to live.

THE NEXT PART OF THIS IS ON PAGE 1429.

"ELAINE THE FAIR, ELAINE THE LOVABLE, ELAINE THE LILY MAID OF ASTOLAT"
From the painting by Mouat Loudan

THE LILY MAID OF ASTOLAT

CONTINUED FROM 1152

THERE lived in Astolat, in the days of King Arthur, a brave old lord with his two sons and a daughter, so fair that she was called the Lily Maid.

So fair was this Elaine that she filled the eye with the whiteness of a lily, and the soul with fragrant thoughts of goodness and of love. She was but a child, a tender maid, and yet she kept the house for the old lord, on to whose knee she would climb for caresses, and to her two brothers, just beginning to dream of knighthood, the Lily Maid was like a mother. Over all in that castle she exercized a sway, the sway of a pure heart and a most lovely soul.

Happily passed the long summer days. What could ever break the spell of that greenwood peace, that hearth-side happiness? The little mother of the castle had ever a song on her lips, the two brothers loved to have her watching their sword-play, and her old father found his age sit light upon his shoulders because in the maid he saw again the loveliness and sweetness of the wife who awaited him in heaven. What could ever break the spell of that joyful happiness?

One day there sounded in the court-yard the clatter of a horse's hoofs, and presently there strode towards the door a mighty armed figure, with shield and spear, the blazoned shield dented by many strokes, the sun-burned cheek of the warrior scarred by a sword-cut. He confessed no name, but asked of the Lord of Astolat a favor.

"I go to joust," said he, "for King Arthur's diamond; but because men say it is my name rather than my spear that gets me triumph, I would go this time secretly and unknown. Therefore, good lord, let me, I pray you, leave here my blazoned shield, well known at Arthur's Table, and take with me hence one that is innocent of all device, that no man in the tournament may know me."

The little maid looked at the knight, and her heart leapt up in her bosom. The Lily Maid looked upon Lancelot—the brave, noble, but world-stained Lancelot, not knowing his name, and loved him for the carriage of his head, the aspect of his eye, the steady music of his voice. Never had she looked upon man so near divine. To the simple maid, the war-scarred soldier thrice her age was as a god from heaven.

While he stayed at the castle she looked upon him much and loved him more; and when he left his shield with her she gave him a broidered sleeve to wear in the tournament, "for my sake." The great Lancelot laughed lightly, for never had he worn lady's favor, his heart being given in secret to Queen Guinevere; but as one humors a child, so he took the pretty sleeve and bound it round his helmet, and rode away with one of Elaine's brothers as his squire.

Then Elaine watched over the shield Lancelot had left behind, and

learned to know every mark and wound upon it, and the more she dwelt upon the scars, the more she loved the great, stern knight who had outlasted such deadly conflict. His eyes came to her in her dreams. His voice was always in her ears. Poor maid, poor Lily Maid of Astolat!

The days passed, and at last there came a knight of Arthur's Table to Astolat, bearing with him the diamond. He said that he had thought to find Lancelot there, but he was wounded, and would no doubt presently return to claim his shield. When that occasion came, said he, let the diamond be given to him, for now King Arthur knew his name. So spake the knight, and rode away.

Then Elaine, knowing at last the name of her hero, cried to her father that she might go and seek him with the diamond, and he suffered her. So with her brother she set out, and came at last where Lancelot lay sick unto death in the cave of a hermit.

The Lily Maid approached the bed whereon the pale knight lay, and, her heart swelling with love, laid the diamond in his hand.

Her face was near, and as we kiss the child
That does the task assigned, he kissed her face.
At once she slipt like water to the floor.
"Alas," he said, "your ride hath wearied you!"

He did not know how she loved him; his man's heart could not guess the depth of this pure maid's worship. He treated her like a child. And when he grew well, and she saw that he did not know, and that he might ride away without a word to her, she told him of her love. But Lancelot smiled upon it as a mere fancy that would pass, called her "child," bade her love one more worthy of her, and in his heart sighed for the love of Guinevere.

But Elaine cried that she could not live without him; that if she might not be his wife, let her at least go with him through the world. All this the great knight treated as the fancy of a child.

"It will pass," he told her. "I have known such flashes in my own youth."

And then, because her nursing had given him back his life, he declared to her that when she came to marry one of her own age he would bestow upon her half of his territory, and that he would be always her knight, with sword and spear held ready at her service.

While he spoke
She neither blushed nor shook, but deathly pale
Stood grasping what was nearest, then replied:
"Of all this will I nothing"; and so fell,
And thus they bore her swooning to her tower.

Then the old Lord of Astolat came to Lancelot, saying, "Use some roughness to her, peradventure, then the love she bears thee will return to her bosom." But Lancelot could not speak harsh words to the Lily Maid; yet when he rode away he took no leave of her, and she, who had never guessed that her so great love could be despised and cast aside, looking down from her window, saw him depart without a word. Her heart broke within her. She had given all her love to him, given all herself; there was nothing now—nothing. The old lord and his two sons watched the maid fade swiftly towards the shores of death.

Lancelot forgot the Lily Maid at Arthur's court, and gave himself up to the delights of converse with the beautiful queen. His wound was healed, his health returned: he began to take pleasure in life. Far away in his memory dwelt the kindness and sweetness of the simple little maid who had so innocently offered him her love.

One day, as he sat with Queen Guinevere, they looked from the window, and lo! a great barge, solemnly draped, floated towards the castle; and the barge carried a maiden's bed, and on the bed lay the Lily Maid of Astolat in royal robes, with her gold hair spread upon the pillow, a lily in one hand and a letter in the other. And this was the letter, which King Arthur read aloud when the lovely maid had been solemnly borne into the hall, and while Lancelot mused upon the child innocence of her face and remembered all her love for him:

Most noble lord, Sir Lancelot of the Lake,
I, sometimes called the Maid of Astolat,
Come, for you left me taking no farewell,
Hither, to take my last farewell of you.
I loved you, and my love had no return,
And therefore my true love has been my death.
And therefore to our Lady Guinevere,
And to all other ladies, I make moan:
Pray for my soul, and yield me burial.
Pray for my soul thou, too, Sir Lancelot,
As thou art a knight peerless.

And so ends the story of Elaine the Fair, Elaine the Lovable, Elaine the Lily Maid of Astolat.

THE THREE BEARS

GOLDILOCKS TOOK UP THE SPOON AND ATE UP ALL THE BABY BEAR'S DINNER

THREE bears lived in a house in a wood. There was the father bear, the mother bear, and the baby bear. The first was a great big bear, the second was a middle-sized bear, and the third third was a tiny wee bear. In the kitchen was a table, and beside the table there were three chairs. The first was a great big chair, the second was a middle-sized chair, and the third was a tiny wee chair.

One day the three bears went out for a walk. Before they started mother bear prepared the dinner, and poured it into three basins. The first of these was a great big basin, the second one was a middle-sized basin, and the third one was a tiny wee basin.

While they were out a little girl named Goldilocks passed by that way, and looked in at the window. She was very cold and hungry, and the bread and honey in the basins looked very tempting. So she pushed open the door and walked in.

"How good it smells!" she said. And she sat down in the great big chair. But it was much too large for her. So she tried the middle-sized chair, but that was not high enough; so she sat down in the tiny wee chair. which just fitted her.

She took up the spoon and soon ate up all the little baby bear's dinner.

When she had finished she began to feel very tired, and thought she would

GOLDILOCKS RAN DOWN THE STAIRS AS FAST AS SHE COULD & ESCAPED INTO THE WOODS

like to lie down. So she went upstairs into the bedroom, where she found three beds. The first was a great big bed, the second was a middle-sized bed, and the third was a tiny wee bed. First she tried the big bed, but it was much too big. So she got out again and tried the middle-sized bed. But that was too big, so she jumped into the tiny wee bed and fell fast asleep.

Soon the bears came back, and as their walk had made them very hungry they went straight up to the table.

"Someone's been sitting in my chair," cried the great big bear in a great big voice.

"Someone's been sitting in my chair," cried the middle-sized bear in a middle-sized voice.

"And someone's been sitting in my chair," cried the tiny wee bear in a tiny, wee voice.

Then they looked into their basins.

"Someone's been tasting my dinner," cried the great big bear in a great big voice.

"Somebody's been tasting my dinner," cried the middle-sized bear in a middle-sized voice.

"And somebody's been tasting my dinner and eaten it all up," cried the tiny wee bear in a tiny wee voice.

"Who is it?" cried all the bears together. And they all ran upstairs. The great big bear ran to the great big bed.

"Somebody's been lying in my bed," he cried.

The middle-sized bear ran to the middle-sized bed.

"Somebody's been lying in my bed," she cried.

And the tiny wee bear called out in a tiny wee voice:

"And somebody's been lying in my bed—and, oh, here she is!"

Just at that moment Goldilocks woke up and saw the three bears looking angrily at her. She was so frightened that she jumped up and ran down the stairs as fast as ever she could, and out of the house into the wood, and they never saw her again.

THE EMPEROR AND HIS SERVANT

A POOR man went to the palace of the emperor, and asked to be engaged as a servant. "What can you do?" inquired the emperor.

"I can act as body-guard to your Majesty," he said. "I can watch when others sleep, and sleep when others watch; I can drink a beverage and tell whether it be good or not; I can invite suitable guests to a feast, and I can make a fire without smoke."

The emperor engaged the man, and, first of all, he was employed as body-guard. Every night after the ruler had retired he lay at the door, fully armed, with a dog who would bark if any one approached.

So well did he do this that after a year the emperor told him to perform his second task. The man carefully collected, during the summer, a vast store of necessary things, while others were engaged in pleasure, and then when winter came he was able to take his ease while the others worked.

"Now," said the emperor, "drink this cup of wine that I have had prepared, and tell me what you think of it."

The man drank it quickly, and said: "It was good; it is good; it will be good."

"Explain!" said the emperor.

"Well," replied the man, "the cup contained vinegar, old wine, and new wine. The vinegar was good before it turned sour, the old wine is good, and the new wine will be good when it has matured."

"Perform your fourth task," said the emperor. "I will give a feast; invite suitable guests to it."

The man went out and invited only the emperor's enemies. When his master saw the guests, he was very angry. But the man replied:

"Sir, I invite your enemies because, by showing kindness to them, you will make them friends." And so it proved.

The man was now asked to carry out the fifth task—that of making fire without smoke.

"It shall be done at once," he replied. And taking thin twigs that had been thoroughly dried in the sun all the summer, he applied a light, and they blazed up without smoldering and smoking.

The emperor was so pleased with him that he promoted him to a high office.

THE PRINCESS AND KING GRISLYBEARD

A GREAT king had a daughter who was very beautiful, but so proud and conceited that none of the princes who came to ask her in marriage were good enough for her, and she only laughed at them.

Once upon a time the king held a great feast, and invited all her suitors; and they sat in a row according to their rank. Then the princess came in and passed by them all, but she had something spiteful to say to every one. The first was too fat, the next was too tall, the next was too short, the fourth was too pale, the fifth was too red, and the sixth was not straight enough. But she laughed more than all at a good king who was there.

"Look at him," said she; "his beard is like an old mop. He shall be called Grislybeard." So the king got the nickname of Grislybeard.

But the old king was very angry when he saw how his daughter behaved, and he vowed that she should marry the first beggar that came to the door.

Two days after there came by a traveling musician, who began to sing under the window and beg alms; and when the king heard him he said, "Let him come in." So they brought in a dirty-looking fellow; and when he had sung the king said, "You have sung so well that I will give you my daughter for your wife."

The princess begged and prayed; but the king said, "I have promised to give you to the first beggar who came, and I shall keep my word." So she was married to the musician.

Then the beggar took her with him; and they soon came to a great wood.

"Whose is this wood?" she asked.

"It belongs to King Grislybeard," he answered. "If you had taken him, all would have been yours."

"Ah, how unlucky I am!" she sighed. "I wish I had married him."

Next day they came to some fine meadows.

"Whose are these beautiful green meadows?" she said.

"They belong to King Grislybeard; if you had taken him, they would have been yours."

"Ah, how unlucky I am!" she said. "I wish I had married King Grislybeard!"

Then they came to a great city.

"Whose is this noble city?" she asked.

"It belongs to King Grislybeard; if you had taken him, it would have been yours."

"Ah, how miserable I am!" she sighed. "Why did I not marry King Grislybeard?"

"That is no business of mine," said the musician. "Why should you wish for another husband? Am I not good enough for you?"

At last they came to a small cottage.

"What a paltry place!" said she. "To whom does that little dirty hole belong?"

The musician answered, "That is our house, where we are to live. Now make the fire, and put on water and cook my supper, for I am very tired." But the princess knew nothing of making fires and cooking, and the beggar was forced to help her.

When they had eaten a very scanty meal they went to bed; but the musician called her up very early in the morning to clean the house. Thus they lived for two days; and when they had eaten up all there was in the cottage the man said, "Wife, we can't go on thus, spending money and earning nothing. You must learn to weave baskets." Then he went out and cut willows, and brought them home, and she began to weave; but it made her fingers very sore.

"See now," said the musician, "you are good for nothing, you can do no work—what a bad bargain I have got! However, I'll try and set up a trade in pots and pans, and you shall stand in the market and sell them.

"Alas!" she sighed, "when I stand in the market, and any of my father's court pass by and see me there, how they will laugh at me!"

But the beggar did not care for that, and said she must work, if she did not wish to die of hunger. He bought a lot of ware, and she sat down with it in the corner of the market; but a drunken soldier soon came by, and rode his horse against her stall and broke all her goods into a thousand pieces. Then she began to weep, and knew not what to do. So she ran home and told her husband.

THE MUSICIAN POINTED OUT GRISLYBEARD'S CITY TO THE PRINCESS

"Who would have thought you would have been so silly," said he, "as to put an earthenware stall in the corner of the market, where everybody passes? But let us have no more crying; I see you are not fit for this sort of work, so I have been to the king's palace, and asked if they did not want a kitchen-maid, and they have promised to take you." Thus the princess became a kitchen-maid, and helped the cook to do all the dirty work.

She had not been there long before she heard that the king's eldest son was going to be married. Then she thought of her own sad fate, and bitterly grieved for the pride and folly which had brought her so low.

Suddenly, as she was going out, in came the king's son in golden clothes, and she saw that it was King Grislybeard himself. She sprang to the door to run away, but on the steps King Grislybeard overtook her and said:

"Fear me not! I am the musician who lived with you in the hut. I brought you there because I loved you. I am also the soldier who upset your stall. I have done all this only to cure you of pride. Now all is over; you have learned wisdom, your faults are gone, and it is time for our marriage feast!"

Then the chamberlains came and brought her the most beautiful robes; and her father and his whole court were there already, and congratulated her on her marriage. Joy was in every face. The feast was grand, and all were merry.

THE BRIDE OF THE WANDERING PRINCE

THERE was once a king who had three sons. Not far from his kingdom lived an old woman who had an only daughter called Cherry. The king sent his sons out to see the world, that they might get wisdom and skill in ruling the kingdom that they were one day to have for their own.

The princes, while wandering on, came one day to the town where Cherry and her mother lived, and as they passed along the street they saw the fair maiden standing at the window. Then each of the three fell in love with her, and began to say how much he longed to have her for his wife.

Scarcely had the wish been spoken when all drew their swords, and a dreadful battle began. An abbess who lived near by, hearing the uproar, came

to her gate, and in her rage she wished that Cherry might be turned into an ugly frog. No sooner said than done. Poor Cherry became a frog, and vanished. The princes had now nothing to fight for, so they shook hands and returned to their father's home.

Meanwhile the old king, who found that he was growing weak, decided to give up the kingdom, and calling his sons to him, he said:

"My dear children, I grow old and weak, and should like to give up my kingdom; but I cannot make up my mind which of you to choose for my heir. I love you all three; and, besides, I should wish to give my people the cleverest and best of you for their king. So I will give you three trials, and the one who wins the prize shall have the kingdom. The first is to seek me out a hundred yards of cloth, so fine that I can draw it through my golden ring."

The sons said they would do their best, and set out on the search.

The two eldest brothers took with them many followers, to bring home all the beautiful cloths they could find; but the youngest went alone. They soon came to where the roads branched off into several ways. Two ran through smiling meadows, with smooth paths and shady groves; but the third looked dreary and dirty, and went over barren wastes. The two eldest chose the pleasant ways, and the youngest took his leave and tramped along the dreary road whistling as he went. Whenever fine linen was to be seen, the two elder brothers bought it. The youngest, on the other hand, journeyed on for many a weary day, and found no place where he could buy even one piece of cloth that was at all fine and good.

At last he came to a bridge over a stream, and there he sat himself down to rest, when an ugly-looking frog popped its head out of the water, and asked what was the matter.

The prince said crossly, "Silly frog, you cannot help me!"

"Who told you so?" said the frog. "Tell me what is the matter."

After a while the prince told the frog what his father had sent him out to look for.

"I will help you," said the frog; and it jumped back into the stream and soon came back, dragging a small piece of

THE THREE PRINCES SAW A FAIR MAIDEN SITTING AT A WINDOW

linen not bigger than one's hand, and by no means the cleanest in the world. The prince had no great liking for such a dirty rag; but still there was something in the frog's speech that pleased him, so he put the rag in his pocket and thanked the frog.

He reached home about the same time that his brothers came up, all heavily laden. The old king was very glad to see his children again, and took his ring from his finger to try who had done best; but in all the stock which the two eldest had brought there was not one piece which would go through the ring. Then the youngest pulled from his pocket a piece which was so fine that it passed with ease through the ring. The father embraced the lucky youth, and said to his children:

"Now you must set about the second task which I am to set you. Bring me home a little dog, so small that it will lie in a nut-shell."

His sons were frightened at such a task; but they all longed for the crown, and so after a few days they set out once more on their travels. At the cross-ways they parted as before, and the youngest chose his old dreary road. Scarcely had he sat down again by the bridge when his friend the frog croaked out, "What is the matter?"

The prince had this time no doubt of the frog's power, and therefore told what he wanted.

"It shall be done for you," said the frog; and, springing into the stream, it soon brought up a hazel-nut, and told him to take it home to his father, and crack it gently.

His brothers reached home first, and brought with them a great many little dogs. The old king, willing to help all he could, sent for a very large walnut-shell, and tried it with every one of the little dogs; but none could sit easily in this new kind of kennel.

When all had been tried, the youngest made his father a dutiful bow, and gave him the hazel-nut, begging him to crack it very carefully. The moment this was done, out ran a beautiful little white dog upon the king's hand. The joy of everyone was great; the old king again embraced his lucky son, and said to his children:

"Dear sons, your weightiest tasks are over; now listen to my last task. Whoever brings home the fairest lady shall be the heir to my crown."

The prize was so tempting, and the chance so fair for all, that none hesitated about setting to work, each in his own way, to try to be the winner. The youngest was not in such good spirits as he was the last time. He thought to himself, "The old frog has been able to do a great deal for me; but all its power will be useless now, for where can it find me a fair maiden?"

However, he went on, and sighed as he sat down again by the bridge.

"Ah, frog," he said, "this time you can do me no good!"

"Never mind," croaked the frog; "only tell me what is the matter."

Then the prince told his old friend what trouble had now come upon him.

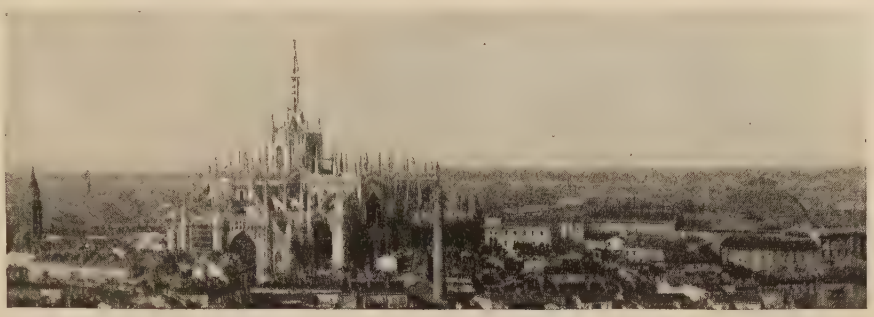
"Go home," said the frog; "the fair maiden will follow after."

The prince trusted very little this time to the frog's word; but he had not gone far towards home before he heard a noise behind him, and, looking round, saw six large rats dragging a pumpkin like a coach. On the box sat an old fat toad as coachman, behind stood two little frogs as footmen, and two fine mice, with stately whiskers, ran before as outriders; within sat his old friend the frog, rather misshapen and unseemly, to be sure, but still with rather a graceful air as it bowed to him in passing.

The coach passed on, and soon turned a corner that hid it from his sight; but how astonished he was, when he turned the corner himself, to find a handsome coach and six black horses standing there. On the box sat a coachman in gay livery, and, within, the most beautiful lady he had ever seen, who proved to be the fair Cherry, for whom his heart had so long ago panted! As he came up the servants opened the door, and he seated himself with joy beside the beautiful lady.

They soon came to his father's city, where his brothers also came with trains of fair ladies; but as soon as Cherry was seen all the court gave her, with one voice, the crown of beauty. The delighted father embraced his son, and named him the heir to his crown. Then the prince married Cherry, and lived long and happily with her.

THE NEXT STORIES BEGIN ON PAGE 1353.



THE BRAVE CARDINAL OF MILAN

CONTINUED FROM 1180

THERE is a terrible sickness which from time to time breaks out in the East. It is called the "Plague," and is a typhoid fever exceedingly violent and rapid, accompanied by frightful pain and suffering, usually ending in death. Some people suppose that it is caused by the marshy, unwholesome state of Egypt after the waters of the Nile have gone down, and it generally remains in Egypt and Syria until its course is checked by the cold of winter.

At times this disease has become unusually infectious, and then it has come beyond its usual boundaries and made its way all over the West. Two hundred years and more ago these dreadful outbreaks were rendered more frequent owing to the fact that people lived very dirty and unhealthy lives, being crowded together inside the walls of a town, and not being able in times of war to live outside the fortifications. The plague often followed war, and swept away many poor creatures who had been weakened by previous want.

The desolation of a plague-stricken city was a sort of horrible dream. Every infected house was marked with a red cross, and carefully closed against all persons. The bodies of the dead were thrown into large trenches, without prayer or funeral rites, and these were hastily closed up. Whole families died together, untended save by one another, with no aid from without, and the last chances of life lost for want of drink or food.

Such visitations as these did indeed prove whether the pastors of the afflicted flock were shepherds or hirelings. So felt, in the year 1576, Cardinal Carlo Borromeo, Archbishop of Milan —who used to preach in that beautiful building rising above the great city of Milan, as in the picture on this page—when he learnt at Lodi that the plague had made its appearance in his city. Remarkably enough, in this very city there had lately been such wickedness that he had solemnly warned the people that, unless they repented, they would certainly bring down on themselves the wrath of Heaven. His council of clergy advized him to remain in some healthy part of the country till the sickness was over, but he replied:

"The duty of a bishop is to give his life for his sheep, and I cannot rightly abandon them in this time of peril."

The council agreed that to stand by to comfort and help the afflicted was the higher course.

"Well," said he, "is it not a bishop's duty to choose the higher course?"

So back into the town of deadly sickness he went, leading the people to repent, watching over them in their sufferings, visiting the hospitals, and, by his own example, encouraging his clergy in carrying spiritual consolation

to the dying. All the time the plague lasted—four months—his exertions were fearless and unwearied, and what was remarkable was that of his whole household only two died, and they were persons who had not been called to go about visiting the sick.

Indeed, some of the rich who had repaired to a beautiful villa, where they spent their time in feasting and amusement, were even there attacked by the pestilence, and they all perished, their dainty fare and their grandeur having no doubt been as bad a preparation for sickness as the poverty of the starving people in the city, whereas the strict and regular life of the cardinal and his clergy, and their home in the spacious and airy palace, no doubt preserved them from the plague; but, in the opinion of the time, there was little short of a miracle in the safety of one who daily preached in the cathedral, bent over the beds of the sick, giving them food and medicine, and administering the last rites of the Church, and then braved the contagion after death, rather than let the corpses go forth unblest to their common grave. Nay, so far was he from seeking to save his own life that, kneeling one day before the altar in the beautiful cathedral, he solemnly offered himself, like Moses, as a sacrifice for his people. But, like Moses, Carlo Borromeo remained untouched by the plague, as did also his twenty-eight priests.

No wonder that one of the chief memories that haunts the glorious white marble cathedral of Milan is that of St. Carlo Borromeo, who practised mercy on a people, and risked his own life in faithfully carrying out the duty of a good shepherd over his people.

THE COLOSSAL STATUE OF CARLO BORROMEO STANDING IN A PARK AT ARONA, ITALY

This, one of the largest statues in the world, 112 feet from the ground to the top, was erected in 1697, and, standing on a height above the town of Arona, it looks over the lovely Italian lake of Maggiore. It is so large that people can climb up inside the statue, which is hollow, and stand inside the head!

THE NEXT GOLDEN DEEDS BEGIN ON PAGE 1329.

WHAT THIS STORY TELLS US

WE think of a reptile as the meanest thing that crawls, and if a man is mean and deceitful and false he is called a reptile. This is too bad to the real reptiles, which come of a very old and respectable family. We ought to speak respectfully of our elders, and, that being so, we should not be impolite to the reptiles, for they are of a far older family than that to which man belongs. We know that reptiles appeared upon the earth next to the fishes and long ages before man, yet we despise him as if the whole reptile family were composed of serpents, which are members of the reptile household. If you told a gentleman who had had turtle soup for dinner that he had been feasting on reptiles he would be disgusted. But it would be true. The turtle which makes the soup is a reptile. There are very many forms of reptiles, big and little, useful and dangerous, and we read here of many members of the family.

REPTILES, THE OLDEST ANIMALS

CONTINUED FROM 1076

WHAT is a reptile? It has cold blood, it creeps, it has a scaly skin, which may be armored with scales or horn, as in the case of the tortoise and turtle. It breathes as we breathe, all its life, and is not first a fish, which breathes the air in water by means of its gills.

Nearly every boy and girl thinks that a frog is a reptile. It is not. It is an amphibian—an animal that begins life like a fish in the water, and during its life in the water breathes with gills, and afterwards becomes an animal, breathing air.

The reptiles are, in addition to the turtles and tortoises, lizards, snakes, and crocodiles of all sorts. There used to be more forms of reptiles than now exist. Many have become extinct, and among these the largest.

There were all sorts of giant lizards with many and huge teeth. There were creatures with long necks and short tails which could live on the land or in the water, and killed and ate other reptiles. There were giants which lived wholly in the waters, having bodies like whales, whose legs and arms became paddles, and whose structure and habits allied them to the amphibians and the land mammals. There were great lizards which had beaks like the beaks of monstrous birds. There were things like fearful crocodiles, but eighty feet long and thirty feet high, with awful teeth. Then there were the great flying reptiles, some of which had wings twenty-five feet broad and great toothed beaks. It is a blessing that these have gone. Serpents and crocodiles such as we have in the world to-day are bad enough, but they are mild creatures compared with these terrible giants of long ago.

Our reptiles are the poor and comparatively puny descendants of these horrors. To know what the old ones were like we have to dig down into the rocks which once were mud into which the dying monsters sank. But we have still living one reptile which seems hardly to have changed at all, and from that we get a living lesson to tell the story of millions of years ago.

This reptile is the sphenodon, or hatteria, called also the tuatera, a reptile which looks very much like a lizard, but is not a lizard. It is a descendant of the old, old reptiles, almost unchanged. You know that in history many families spring from one family, take different names, go into different countries, follow

Copyright, 1908, by Amalgamated Press, Ltd.

different trades, and become changed in many ways from the original family. In course of time the members of the family are lost to sight. They die, or, through many marriages in generation after generation, no more bear the name of their House. But a son of the House may live, and his son's son may have sons, and for generation after generation that family, with its name and characteristics, may live on, by this single line, through all the changes of the world, so that to-day we may find in a village cottage the last direct descendant of a great family of the long ago.

THE SPHENODON, THAT BEARS THE LIKENESS OF THE FIRST REPTILE

And that, very likely, is what has happened with the sphenodon, as it happened, we all remember, in the case of the platypus and the echidna.

Here, after millions of years, we have almost the same type of reptile as that which founded its family. It is a beast of from twenty-four to thirty inches in length, dull olive green, spotted with yellow, but whitish on the under-side. It has the legs and claws of a lizard; it has scales like a lizard. Along the ridge of its back run prickly spines. Most lizards, if caught by the tail or the leg, can snap off the member by which they are held, and grow a new tail or a new leg, as the case may be. The tail of the sphenodon is brittle, and can be snapped off like this, and a new one grown in its place.

The head of the sphenodon is its chief curiosity. It has teeth, not only along the jaws, but down the centre of the roof of its mouth. These do not fit into sockets like our teeth, but grow directly out of the bone of the jaws and palate. When, in course of time, these teeth are worn down, they are not renewed like the teeth of a rat or a rabbit or a beaver. They wear right down to the bone, and the sphenodon is left practically toothless. It eats small animals, but when its teeth have gone it bites with its bony jaws.

THE SPHENODON REMINDS US OF THE TIME WHEN ANIMALS HAD THREE EYES

The most remarkable feature of the sphenodon is, however, the remnant of a third eye, which is found at the top of its head. The sphenodon cannot see with this eye; for seeing it uses the two eyes at the sides of its head. But once upon a time it did use this eye for looking upward without turning up its head.

Traces of this eye have been found in all creatures which have a backbone, but its nature was not understood, and a great man declared that it was the seat of the human soul. But the sphenodon solves the mystery for us. Once animals had three eyes, and this "pineal eye," as it is called, is the remnant of what was an organ of vision. It is more plainly to be seen in the sphenodon than in any other creature; but even here it is now of no use, for it is covered with a horny scale.

The sphenodon once lived in thousands in New Zealand, long before human beings appeared there. But the Maoris killed all they could find, and pigs killed and ate still more. So now the poor creature has its home only in little islands near New Zealand, where human beings do not go, and lives in a burrow all day long, and comes out at night to feed. It ought to be carefully preserved, for it is really a living fossil, a link with the animal life of millions of years ago.

As we have seen an animal called a lizard which is not a lizard, we will now look at the lizard family proper.

THE LIZARD THAT WARNS ITS FRIENDS WHEN THE CROCODILE IS COMING

Lizards live in all lands except where the ice and snow never melt. They are found in England and in the northern United States, and they attain great size in warmer lands. There is one in the Himalayas a foot in length which resembles a flabby-skinned crocodile, and lives on the putrid flesh of dead animals and birds. Others are to be found in deserts, where animal life would seem almost impossible.

The most important lizard is the monitor, the biggest and best developed of the family. It lives in the rivers of India and Africa, and is feared by the natives. In India they say that the baby monitor is more deadly than the serpent, which is quite untrue. It grows to a huge size. There is one in the London College of Surgeons which measures nearly seven feet. The principal food of the monitor is crocodile eggs, or young crocodiles, while its greatest enemy is the big crocodile itself. It is said that when a monitor sees a crocodile approaching it gives

its fellows warning with a hiss, when they all plunge into the water. That is how it gets its name of monitor.

Down in the south-western corner of the United States, in the hot deserts, there are scores of kinds of lizards, some very beautiful in color, some dull and ugly in appearance, and one, the heloderma, yellow and black, with a poisonous bite. It is the only poisonous lizard known. In Florida and westward along the Gulf coast, one sees everywhere the pretty and harmless little green lizards which some people call chameleons, but which are not that at all. We have two sorts of small, harmless lizards, which are commonly seen, however, all over the warmer eastern parts of the Union. The most numerous and widespread of these is the fence-lizard, or swift, which can run like a streak when frightened. It is greenish or bluish or bronzed above, with black, wavy crossbars, and in the throat and lower parts is brilliant blue and black; but it varies greatly in color.

THE LIZARD THAT CAN SNAP HIS TAIL IN TWO AND GROW ANOTHER

From lizards to snakes the step is not far, so it is not surprising to find lizards which resemble snakes, with long, slender, snake-like bodies and tiny legs. One of them, the glass-snake, has no visible legs at all. It is called a glass-snake because the body is so brittle that, if caught, it can snap off its tail as easily as you could snap thin glass. Nature enables it to do this by constructing its bones in such a way that they may be easily separated. By this means the glass-snake can slip away, and grow more tail, ready to break at another attempt to catch him.

There is a sort of northern glass-snake which can break off its tail, and so escape. This is called the blind-worm. It looks more like a small snake than a worm, for it has excellent eyes; but it is not a snake, nor a worm It is one of the legless lizards, and is fairly common in Europe. It eats slugs and worms, and is a capital friend of the gardener, if he could only believe it. In the autumn it meets its friends, and, to the number of a dozen or more, they hide under fallen leaves or in a hole at the foot of a tree to sleep the winter away. The blind-worm is one of the family of lizards called skinks.

The skink is six or eight inches long, only half the length of the blind-worm, and lives in Africa. There are many varieties. Some have excellent legs, some have very weak legs, some have only pretences at legs, and some, the acontias, like the blind-worm and the glass-snake, have no legs at all.

THE LITTLE LIZARDS THAT CAN WALK UPSIDE DOWN LIKE FLIES

There are about 1,800 sorts of lizards, so we cannot do more than glance at the most remarkable. One of the commonest in Africa, India, and other warm countries, is the gecko, yet it is one of the strangest. Some of them run about the houses like flies. They run up and down the walls, and cross the ceilings, walking back downwards, just like the flies and other insects which they are seeking for food. They can do this because their feet are provided with discs which act as suckers, thus enabling them to cling to smooth walls and other surfaces as the fly clings.

The most wonderful thing they do is to climb a smooth tree and walk head downwards on the under-side of its big leaves. They are really useful to man, but natives are terribly afraid of them, believing that the little lizards deliberately poison human food by walking over it with their feet. In the feet, they think, the gecko carries its poison, and so they call it the toe-spitter. Really it has no poison, neither does it cause illness, although the natives call it "the father of leprosy."

THE HARMLESS LIZARD THAT FRIGHTENED MEN FOR AGES

In another big lizard family we find the iguana, of which there are nearly sixty varieties. The common iguana is to be found all over Mexico and Central America, and the people eat it. It may be anywhere from three feet to six feet in length, and as it lives almost entirely in the trees its color is naturally green, to resemble the foliage upon which it feeds. With its long tail, its scaly body, its spiny back, and the hanging pouch beneath its throat, it looks very grim, but not so formidable as the African basilisk.

The basilisk has not the throat-pouch, but it has upon its back a crest-like great fin, which it can move up and down. And, as if to make up for the absence of the throat-sac, it has a sac

upon its head which it can inflate and move backwards and forwards. The basilisk is quite harmless, and as it climbs splendidly, and dives and swims as well as the crocodile, it has quite a good time in life. So remarkable is its appearance that from old times ignorant men have regarded it as a monster of evil. In old writings we find it said that the basilisk was hatched by a serpent from a cock's egg; that to encounter its glance meant death, and that it had to live in a desert because its breath was of fire and burnt up everything living about it.

Another remarkable lizard is the crowned tapayaxin, which people in California and the South-west call the horned toad, from its resemblance to a big toad with horns. Its head is armed with long, horny spikes, and the same sort of weapon occurs all along the back and sides right down to the tip of its tail. The color of this singular lizard is grey, with bands of brown on the back, while underneath it is a brilliant yellow. Its spikes were not formed for the fun of the thing, nor are they for ornament; they are for its protection.

THE LIZARD ARMED WITH SPEARS, WHICH CATCHES FLIES ON THE WING

Terrible as it looks, this creature is harmless. When attacked, it burrows with amazing rapidity into the sand and disappears. It can deceive men into thinking that it has popped down a hole. But its animal enemies know its habits, and they pounce upon it more quickly than we can. Therefore the tough spikes with which it is armed serve as protection while the lizard is digging. An enemy would seize it by the tail, but there are the spikes all the way along, ready to pierce any mouth into which it might be drawn.

When captive, this lizard is very sluggish, but when wild and in search of food it can run like a flash of lightning, as, of course, it must, to catch the flies upon which it lives. Most reptiles are thought to be lazy and sluggish things, but some lizards run very swiftly. One living in Transcaspia runs so swiftly that we can only see its shadow as it scurries along with its tail curled up over its back. As a rule, the lizards which are most fleet of foot are those least heavily armored. Those which cannot run so fast need greater protection from their enemies. It is because he is one of the most sluggish of the family that the frightful-looking moloch, the spiny lizard of Australia, is so smothered with prickles. It has a horn above each eye and another in the middle of its head. And all over its body, sides, back, legs, toes, one could scarcely stick a pin for spikes and horny warts. Luckily, it is only about ten inches long.

THE FLYING DRAGON THAT HUNTS IN THE AIR WITH A PARACHUTE

Leaving this old slow-coach, we jump now to the opposite extreme, to find a lizard so active that it is called the flying dragon. It is not a very big lizard, being only a few inches in length, but it is very important to us as showing what changes can be made in the structure of creatures belonging to the same family. This little lizard lives among the trees and eats insects. Actively as he runs, he is not fast enough for the insects which can fly out from the tree in which he hunts, so gradually the lizard has grown a parachute along the sides of its body.

It is not like the parachute of the other flying animals of which we have read. Here the ribs of the lizard grow straight from the body, farther than the spread of its arms, and a skin grows over and covers them all. The ribs can be moved so that the little dragon can fold up his parachute when he does not need it. When he wishes to launch himself from one tree to another, or from a height to the ground, he straightens out his wings and flits away so rapidly that the eye cannot follow him from branch to branch. He can cover a distance of thirty feet, and can guide himself in the direction he wishes to take.

THE LIZARD WITH A FRILL THAT OPENS AND TERRIFIES ITS ENEMIES

There is a flying gecko, which has a sort of fringe round its body, like the wing membrane of a bird and like the membrane which the flying monsters of old time had. The fringed lizard must not be confused with the frilled lizard, an extraordinary creature living in Australia. The frilled lizard is about three feet long, and can run on its hind legs like the old monsters did. Instead of a parachute or fringe, it has a wonderful frill right round its neck. This at ordinary times lies in folds about the lizard's neck, but

when the reptile is frightened or angry the frill expands into a great circular fan all round its head. The lizard opens its red-lined mouth as wide as possible, and shows an alarming array of teeth, and altogether its appearance is so unusual and horrible that the boldest hunter might fear to go near it. Its frill is intended to frighten the animal's enemies rather than to serve as a wing.

THE CHAMELEON LIZARD, WITH ITS CHANGING COAT OF MANY COLORS

We have now picked out all the most famous of the great lizard family, but we have for the last perhaps the most wonderful of all. There is one which is a sort of crawling rainbow. This is the chameleon, the lizard which can make itself almost any color it wishes. The most sluggish of all the lizards, it crawls along the bough of the trees in which it makes its home as if to-morrow would do for the next step. It must be to make up for this slowness that the chameleon has this power to change color. Its natural color seems to be a grey-black, but beneath its skin are two layers of cells, containing, one, brilliant yellow; the other, dark brown. Somehow or other, the chameleon is able to get the most extraordinary results from the combination. Many of the changes may be accidental, like our blushing.

At one time it may be striped like a zebra, or covered with yellow spots. Next it will be chestnut and black, like a leopard. Then, again, it will turn a brilliant green. When it wishes to make a complete change of color, it draws in a deep breath, which puffs it up far beyond its ordinary size, and next minute the change is made.

HOW THE CHAMELEON CAN LOOK ALL WAYS AT THE SAME TIME

The purpose of this is easy to see. When it is making its way through trees, it does not wish to be seen by snakes which climb trees, so it takes the color of its surroundings. The spots and stripes would well represent the appearance of part of the tree upon which the sun was shining between the twigs and leaves. When the sun is hidden, its natural color on the green of the leaves would make it invisible. Contrast would reveal it, but similarity to its surroundings is a perfect disguise. It is curiously formed in many other respects than this. Its feet are shaped for nothing else than tree-climbing. It has very prominent eyeballs, but they are so covered up by the lids that only tiny beads of the eye appear. To make up for this the chameleon can roll its eyes in any direction. Moreover, when one eye is looking up, the other can look down; one can look to the front, while the other surveys the scene at the back. Then, to make up for its slowness, it has a quick-acting tongue. The lizard itself is only a foot in length, including the tail, which helps it to cling; but the tongue is six inches long. When a fly or an insect appears near the chameleon, the latter shoots out its tongue and catches it. The tongue is shaped like a cup at the end, and is covered with a sticky fluid, from which there is no escape.

Should flies fail to appear, the chameleon does not much mind. He can go for months without food. It is this power of his to fast which made men believe that it lived on air. This chameleon lives in the Old World,—not in America; but the green lizard of Florida is often wrongly called a chameleon.

THE CROCODILE FAMILY, THE RULERS OF THE REPTILE WORLD

We come now to the kings of the reptile world, the crocodiles. The chief forms are the crocodile proper, which lives in Africa, India, Northern Australia, Cuba, and South America; the alligator, which lives only in China and America; and the gavial, which lives in India, Borneo, and Northern Australia. The differences between the three great members of the family are these: The head of the alligator is short and broad; the head of the crocodile is long; the head of the gavial is longest and narrowest of all, and it has an air-sac over the nostrils which it can inflate.

The crocodile, when young, eats fish, but as it grows older it eats animals and men and women. It seizes its victim with its terrible jaws, draws it under the water and drowns it. In order that he may do this without danger to himself, the crocodile has developed a special type of head and throat. He must breathe the air as we must, hence, if he remains long quite under water, he must drown, like the rest of us. Therefore, his nostrils grow at the tip of the

snout, so that he can keep the greater parts of his jaws under water and yet have his nostrils free to breathe. But as he is now holding a man or an animal in his jaws, his mouth is kept open under the water, and there still seems a chance of his being suffocated. But he has a muscular arrangement of the throat which he can close. Thus he can breathe safely, for the nostrils open into the throat behind the valve which keeps the water from flowing down his throat. He breathes while his mouth is full of water.

WONDERFUL STORIES OF LIVING MEN WHO HAVE BEEN BURIED BY CROCODILES

Now, although the crocodile has such a fearful array of teeth, he does not bite up and masticate his food before swallowing it. He tears off the flesh and bolts it. The result is that, after a full meal, the food takes so long to digest that he is reduced to a condition of torpor, and must sprawl about the mud-banks of the river, or lie in the water with his nose peeping out, until his food has been digested. In consequence of this, however, he has learned that putrid flesh is more readily torn and devoured than the flesh of a victim newly killed. Therefore, if he is not specially hungry, he will take the body of a man or an animal and actually bury it, so that the flesh may putrefy.

Hunters say that men who know the habit of the crocodile have escaped, after being caught, by lying perfectly still and pretending to be dead while the crocodile buries them and goes off, leaving them to push aside the earth and dart away. This fondness of the crocodile for putrid flesh is of importance to the countries in which he lives. Many bodies of dead animals float down the tropical rivers. If it were not for the crocodiles, these bodies would poison the waters and the air around.

THE BIRD THAT WARNS THE CROCODILE OF DANGER AND ACTS AS ITS TOOTHPICK

It is very likely on this account, indeed, that wise men among the ancient Egyptians taught the people that they should not destroy these creatures in their hot rivers, and so the crocodiles came to be regarded as sacred.

Crocodiles live for hundreds of years if not molested. They seem to go on growing all the time. Some of those in the upper parts of the Nile attain a length of thirty feet. They have bodies covered with armor which, in the water and mud, look like the logs of trees. In places where they are numerous, they lie so close together in the water as to present the appearance of a raft of logs stretching across the river. Should a hunter appear, however, the crocodile receives timely warning. There is a bird in attendance called the ziczac, from the cry which it makes. Just as the rhinoceros bird warns its master of approaching danger, so the ziczac warns the crocodile or alligator. It does not work for nothing. Upon the body of the crocodile are insects which the bird eats. More wonderful, however, is the way in which these birds act as toothpicks for the crocodile. The latter lies for hours with his jaws open. The little birds run in and out of its mouth and peck off the fragments of flesh which have collected about the crocodile's teeth.

OUR AMERICAN ALLIGATORS—WHERE THEY LIVED AND HOW THEY LIVED

The hot, sluggish waters of Florida, Mississippi, and Louisiana were just the place for alligators, and the first settlers found these reptiles swarming. Their hoarse bellowings could be heard on summer nights like the noise of a herd of angry bulls. Sometimes they were very large, too, so that it was dangerous to go where they were. For that reason it was thought necessary to kill them off. Afterwards it was found that the thick, knobbed hide was valuable as leather. So hunters began killing and skinning them by the thousands. Consequently alligators have almost disappeared from rivers easily reached, and remain numerous only in the remotest swamps.

THE NEWT IN FACT, AND THE SALAMANDER OF FANCY

A little creature common in quiet waters of both America and Europe is often mistaken for a lizard, and so called; but it is not a lizard, but a newt, and a cousin of the frog. It has a lizard's shape, with a long pointed head, four small legs and a long tail, but its skin is not scaly, but smooth and leathery, and it lives most of its time in the water, breathing through gills in the side of its head. The newt must have abundant moisture or it will die. It is so constructed that when it is

out of the water it is able to squeeze moisture through the pores of its skin from a store which it carries underneath, and so keep cool and damp. If it were kept altogether from moisture, its body would dry up, and it would die.

The power of distributing moisture over the outside of its skin enables it to live for some time from water. The salamander, a famous relative of the newt, has this power to an even greater extent. It is a sort of newt, black and yellow and brilliant, which lives in parts of Europe and in Africa, and when touched is so cold and moist that men long believed it could live in a fire without being burnt.

When Benvenuto Cellini, the great artist, was a little boy, he was sitting by the fire, when he noticed what he thought was a little lizard among the red-hot coals. His father suddenly gave him a box on the ears, and made him cry. Then his father said, "My dear little boy, I did not hurt you for any harm that you had done, but only that you might remember having seen a salamander in the fire," then kissed him, and gave him some money. Probably they had not seen a salamander. If it were one, then it had by accident got among the coals and been put on the fire. It would soon die.

How a mother newt lays eggs in a pond and guards them from fish

People believed so firmly that the salamander could live unharmed in the fire that some of them still call asbestos, which fire does not consume, "salamander's wool." There are no longer any salamanders, but we used to have them—giants, with leg-bones bigger than an elephant's.

The mother newt in an English pond lays her eggs one by one on the leaves of plants growing in or by the water. When an egg has been laid, the newt folds the leaf and seals it with a sticky solution, and leaves it safe. It is believed that she guards the eggs, for one has been seen to chase a fish away which was trying to get the eggs.

In about fourteen days the eggs hatch, and the baby newts appear. They look just like little fishes, having little fish-like bodies, without legs. They have gills growing out from the neck, with which they breathe the air in the water. In the course of a fortnight the front legs appear, and at the end of three weeks the hind ones begin to sprout; while the gills get smaller, lungs begin to grow, with which the newt breathes the air of the atmosphere. So far the newt has lived only on vegetation, but now it begins to eat insects. In six weeks the gills disappear, the legs are formed, and the newt, for the first time, leaves the pond and goes to look for worms and snails and so forth.

The merry little frogs and toads that live in the garden

Having glanced at one family of amphibians we may turn to another, the frogs and toads. They are the commonest things in the garden and by the pond-side, yet few people know much about them. They think the frog is a toad, and that both are highly poisonous. As a matter of fact, the toad has a poison under its skin and in those two bumps behind his head, but that poison is only used if a dog or any other enemy attempts to devour it. Then the toad squirts forth this acid and burns the mouth of its enemy; the juice is never used except to enable the toad to get away. The frog has not this poison and is perfectly harmless.

How can you distinguish between the two? Well, the frog has sharp little teeth; the toad has none. The frog has a smooth, damp skin; the toad has a rough skin and shorter hind legs than the frog, and does not leap far. The toad is shy, and comes out only at night from its hole; the frog, though also shy, is bolder than the toad, and hunts by daylight. The female toad lays her eggs all joined together on a sticky string; the frog lays hers all in a mass stuck together, looking like dark soap-bubbles as they float on the water.

The wise mother frog who saved her eggs from the gardener

It is surprizing how clever the frog is in placing her eggs for safety. In a conservatory in a beautiful country garden which the writer knows there are water-tanks to which the frogs go. But the gardeners frequently dip their cans in and take out water, and so might catch and destroy the eggs of the frogs. So a wise mother-frog went outside the conservatory, jumped on to the lowest point of the roof, and laid her eggs in a little gully, just where it enters the top of a pipe leading into the con-

servatory tank. It is by that gutter and pipe that the rain from the conservatory roof is carried from the roof down into the conservatory, so the mother frog knew that there would be plenty of moisture for the eggs. Another frog went lower, to the deep stone drain into which this pipe falls, and placed her eggs there. Then, when they were hatched, all the little frogs had to do was to pop through the short piece of pipe running through the conservatory wall into the great tank.

THE EARLY LIFE OF THE LITTLE TADPOLE, BETTER KNOWN AS TOMMY TOE-BITER

But we have said "little frogs." Now, they are not little frogs at all when born. They are tadpoles, which some of us call Tommy Toe-biters. When first hatched the tadpoles look like baby newts, but they undergo strange changes. At the sides of the neck are the gills with which the tadpole breathes the air in the water—for it could not breathe the air of the atmosphere. It has as yet no mouth, but for a while it lives upon the mourishment which was stored in its little body while in the egg. Under its throat are two tiny hands, or suckers. With these, when it is tired with swimming about, it can fasten itself to a water-leaf and rest and sleep. By-and-by a little horny mouth is formed, and with this it is able to eat small water-weeds. The tadpole goes on growing rapidly, inside and out. The big gills begin to get smaller, and lungs to form inside. Soon the little hind legs begin to appear, for all this time the tadpole has been using his tail as a means of swimming. Next the front legs are formed, and when he is two months old the little one is able to breathe in the water, or to pop up to the surface and take a gulp of the air of the wonderful world beyond his pond or tank.

THE LIFE OF THE TADPOLE WHILE THE GREAT CHANGE IS BEING MADE

Then, when he is ten weeks old, the gills disappear, the horny covering of the jaws falls off, the mouth becomes wider, teeth show, the old skin of the whole body is cast off, and there you have a hungry little tadpole living on his tail. While these rapid changes are being made he loses his appetite a little, and the body has to be nourished on the substance contained in the tail.

When the changes have been made, the tadpole is very hungry, for all the goodness is gone out of his tail. He will eat meat, insects, or other little tadpoles; he will even try with his baby mouth to nibble the toes of little boys who are wading in his pond. This lasts only until he gets out of the water. When at last the tail has quite disappeared, and neat little, trim little froggy in his coat so shiny and green leaps to the land, he wants no more little boys' toes; he is looking out now for worms and caterpillars and insects. Nearly everything that does damage to the flowers in the garden, to the fruit and rare growths in the conservatories, to the crops in the fields, the frog eats.

We have no better friends in the garden than the frog and toad. The frog works by day, the toad works by night, and between them they eat an enormous number of insects. The frog catches flies as the chameleon does, with his tongue, but he has good teeth with which to bite up a beetle. They both go to sleep in the winter, the toad in a damp hole or in the mud, the frog in the mud at the bottom of his pond.

THE GREAT AGE OF THE TOAD AND HIS POWER OF ENDURANCE

Toads live a very long time. We know for certain that they can live for forty years. Sometimes they are said to be found alive in rocks and coal, but nobody has been able to prove this, Dean Buckland tried experiments with toads to prove this and their powers of endurance, and found that toads enclosed in cells cut in limestone were dead in less than a year. Toads in sandstone, through which air, and possibly tiny insects, could enter, lived for two years, and one of them grew fat.

There are many strange varieties of toads in the world. There is a toad which burrows with shovel-like hands. One in South America grows to a length of eight inches. Some live in trees. One of these, the rhacoporus, has little wing-hands, great webs of skin between his toes, enabling him to "fly."

One of the strangest toads is the Surinam toad. The female carries her eggs upon her back, where a skin grows over them and protects them until they are hatched. Then out hop, not tadpoles, but tiny, merry toads.

THE NEXT STORIES OF ANIMALS BEGIN ON PAGE 1379.

THE REPTILE WITH THREE EYES

This is a sphenodon, a living fossil, a relic of millions of years ago, the same in form to-day as sphenodons were when, perhaps, there was not a man alive. Ages ago all animals had three eyes. The sphenodon has the remnant of a third eye plainly visible, on the top of its head, though the eye is now without sight.

The monitor is the biggest and best developed of all lizards. When it sees a crocodile coming, it makes a hissing sound to warn its fellows. The monitor eats the crocodile's eggs, but the crocodile eats the monitor when it can catch it. Monitors grow seven feet long, and bite if attacked, but are usually harmless.

The iguanas are a numerous lizard family of nearly sixty varieties. One branch of the family goes fishing in the sea. Most of them live in the trees, where there is plenty of green food for those that like a vegetable diet, and flies and creeping things for the insect-eaters. The iguana is an ugly creature, but its looks are worse than its bite. It does not harm human beings, except to frighten those who fear its appearance.

THE LIZARD THAT BREAKS IN TWO

Every year somebody in Europe digs up things supposed to be deadly serpents. Generally they are slow-worms, or blind-worms, like this. It looks like a snake, but it is neither snake nor worm, neither is it blind. It is really a lizard without legs. It eats slugs and worms and other things harmful to the garden.

There are but two sorts of lizards in England. This is one of them, the sand-lizard, which lives on flies and other things which do damage to the crops.

This is one of the ugliest of the lizard family, the moloch, of Australia. It is wonderfully armored, but very slow and quite gentle, and eats only ants.

Another reptile wrongly named is the glass-snake. It is a lizard, although we call it the glass-snake. It is named the glass-snake because it is so brittle. If caught by the tail it can snap itself away, leaving its tail in the hand of its startled captor. When free, the glass-snake grows another tail, and is ready for a second escape. The slow-worm, the sphenodon, and many lizards can do the same thing.

THE LIZARD'S COAT OF MANY COLORS

This is a common skink, which loves to burrow in the sand of the desert. It has a transparent lower eyelid, so that when burrowing it can see as through a window, though its eyes are quite shut. Snakes have a scaly covering to their eyes to keep out thorns. In the East natives use skink flesh as medicine.

The frilled lizard is an ugly creature, and alarms strangers to the desert by its habit of running swiftly, open-mouthed, in an upright position.

This is a fringed European lizard with wall suckers on its feet, enabling it to run up walls and across ceilings, just like the flies which it catches and eats.

It would be useless to tell the chameleon, in lizard language, to nail his colors to the mast. He is always changing his color. He has the power to make his skin the color of the leaves among which he is moving. If taken in the hand he can change color with surprizing speed. In many ways the chameleon is the strangest of all the lizards. He is a slow, sleepy creature until a fly appears. Then he swiftly shoots out his six-inch tongue, and the fly is caught. There are no true chameleons in America.

THE MERRY LITTLE FROGS AND TOADS

The horned lizard, often called the horned toad, lives in Arizona. The male has a horn on the nose, and sometimes the female has, though not as a rule.

This shows a newt swimming, and several kinds may be found. All are born in the water, but when grown up leave the pond to live on marshy land.

Frogs and newts and salamanders are born in the water, then they are changed, and leave the water for the land. This is a salamander, which people used to think could live in fire. Salamanders in hot countries go to sleep when water is scarce, as squirrels and other animals in our country go to sleep when winter comes.

The merry little frog begins life like a fish. It has a tail, and lives on it. Then, after nearly three months, it comes to land and eats things that harm the garden.

The toad cannot leap so far as the frog, and is more shy. But he is just as useful as a gardener's friend. He lives to be very old, and can fast for months.

THE KING OF THE REPTILE FAMILY

Crocodiles are cruel, but in one way they serve us by eating the dead bodies of animals which float down the rivers. But for the crocodlies these bodies might poison the water. Here we see the crocodile and the little bird called the ziczac, which picks the food from between the crocodile's teeth.

The alligators have a covering of horny plates, and terrible jaws and teeth. New teeth form in place of those worn out. Alligators are, in this respect, more fortunate than human beings. In America alligators are protected part of the year, because they kill things which damage the crops.

The photographs in these pages are by Lewis Medland, W. P. Dando, Charles Reid, and A. S. Rudland.

CRUSOE FINDS A FOOTPRINT IN THE SAND

Fifteen years had Robinson Crusoe lived alone on his desert island without seeing a sign of a human being. Imagine his sensation of amazement and dread when, exploring the shore one day, he saw the print of a man's naked foot in the sand! But it was eight years more before he saw any human beings, and they were some cannibals who had visited the island to hold a feast. One of their intended victims escaped and was rescued by Crusoe, becoming his servant. This happened on a Friday, so the man was called "Friday."

THE GREATEST STORY OF ADVENTURE

WHEN we read the "Iliad" and the "Odyssey" "The Faerie Queene" and "Don Quixote," we all know that such adventures as those books describe will not fall to us. But in the early part of the eighteenth century an Englishman wrote a story of adventure that for a long time was regarded as a true narrative. He had discovered the art of so telling a story as to induce those who read it to believe it to be true. His name was Daniel Defoe, and his story "Robinson Crusoe." It is a great work of the imagination, although the real adventures of a shipwrecked sailor, named Alexander Selkirk, may have suggested the idea of "Robinson Crusoe" to Defoe. The story has been translated into many foreign languages. It is on account of Robinson Crusoe" that Daniel Defoe is called the Father of English Fiction.

ROBINSON CRUSOE

HOW CRUSOE RAN AWAY AND BECAME A SAILOR

CONTINUED FROM 1186

AT the beginning of his story Robinson Crusoe tells us that he was born in York in 1632, the third son of a good family. His father intended him for the law, but he would be satisfied with nothing but going to sea. His father, a wise and grave man, gave him serious and excellent counsel, telling him that it was men of desperate fortunes, on the one hand, or of aspiring, superior fortunes, on the other, who went abroad upon adventures; that his was the middle state, which he had found by long experience was the best state in the world.

"A few days wore it all off. And about a year after, being one day at Hull, leaving my father and mother to hear of it as they might, and without asking God's blessing or my father's, on September 1st, 1651, I went on board a ship bound for London."

This vessel was wrecked, but the men made their way on shore in a boat sent from a lightship. They landed near Cromer, and walked to Yarmouth, where they had money given them to carry them to Hull or London, as they thought fit. Without heeding the warning of the master of the wrecked vessel, who bemoaned the fact that he had taken one so like Jonah in his ship, Robinson Crusoe hardened his heart against going back and went on to London, where he took passage as a gentleman adventurer on board a vessel bound for the coast of Africa, the captain of which, taking a fancy to him, instructed him what to buy for trading purposes, and on the voyage taught him much about navigation.

"This voyage, the only voyage which I may say was successful in all my adventures, made me both a sailor and a merchant; for I brought home five pounds nine ounces of gold-dust, which yielded me in London, at my return, £300 ($1,500), and this filled me with those aspiring thoughts which have since so completed my ruin."

Investing $500 of his new-gained wealth in another adventure, and lodging the other $1,000 with the friendly captain's widow, Robinson Crusoe once more set out on the same ship, which was this time captained by its former mate. One morning when they were making their course towards the Canary Islands, they were surprized by a Moorish rover of Sallee, and, after a severe fight, were carried prisoners into that port.

While the other men were carried up-country to the emperor's court, Robinson Crusoe was kept as a prize by the pirate captain, and made his slave.

"When," he says, "my new master went to sea, he left me on shore to look after his little garden, and to do the common drudgery of slaves about his house; and when he came home again from his cruise he ordered me to lie in the cabin to look after the ship."

ROBINSON CRUSOE GOES EXPLORING

After Crusoe had succeeded in bringing all the provisions from the wrecked ship to the shore, and building himself a safe shelter from the attacks of man and beast, he began exploring the island on which he was cast, in company with the ship's dog. Nowhere did he find any trace of man, but he discovered many fertile and beautiful places, and a variety of animals and birds which proved good for his larder.

CRUSOE'S ESCAPE FROM THE PIRATE

OR THE STRANGE FISHING EXPEDITION

AFTER about two years had passed, the pirate stayed on shore for a longer time than usual. He took Crusoe with him in his pinnace when he went a-fishing, and Crusoe soon became so skilful at catching fish that he was sometimes sent alone, with a kinsman of the pirate's and a young Moor as his sole companions.

A HEAVY FOG AT SEA AND HOW THE PIRATE WAS CAUGHT IN IT

On one occasion when the pirate was out in the pinnace a thick fog arose, and they had rowed out to sea a long distance before they were aware of it. After this the pirate had the long-boat of the English ship that he had taken fitted up for future excursions of the kind, and this was the beginning of the events that led up to Crusoe's escape, the whole circumstances of which may well be told in his own words:

"It happened that he (the pirate) had appointed to go out in this boat with two or three Moors of some distinction, and had therefore sent on board overnight a larger store of provisions than usual, and had ordered me to get ready three muskets with powder and shot, for that they designed some fowling as well as fishing. The next morning my patron came on board alone, and told me his guests had put off going, and ordered me, with the man and boy, as usual, to go out with the boat and catch them some fish, for that his friends were to sup at his house.

WHY ROBINSON CRUSOE WOULD NOT CATCH FISH FOR HIS MASTER

"This moment my former notions of deliverance darted into my thoughts, for now I found I was likely to have a little ship at my command, and, my master being gone, I prepared to furnish myself, not for fishing, but for a voyage. Thus furnished with everything needful, we sailed out of the port to fish.

"After we had fished some time and caught nothing—for when I had fish on my hook I would not pull them up—I said to the Moor, 'This will not do; our master will not be thus served; we must stand farther off.' He, thinking no harm, agreed, and, being in the head of the boat, set the sails.

"When we were about a league farther out, giving the boy the helm, I stepped forward to where the Moor was, and, making as if I stooped for something behind him, I took him by surprize with my arm under his waist, and tossed him clear overboard into the sea.

"He rose immediately, for he swam like a cork, and begged to be taken in, telling me he would go all over the world with me. But there was no venturing to trust him, so I stepped into the cabin, and, fetching one of the fowling-pieces, I presented it at him, and told him I had done him no hurt, and would do him none if he would be quiet. 'But,' said I, 'you swim well enough to reach the shore, and the sea is calm. But if you come near the boat I'll shoot you through the head, for I am resolved to have my liberty!' So he turned about and swam for the shore; and I make no doubt but he reached it with ease, for he was an excellent swimmer.

CRUSOE AND HIS BLACK BOY MAKE A VERY LONG VOYAGE

"When he was gone I turned to the boy, whom they called Xury, and said, 'Xury, if you will be faithful to me, I'll make you a great man; but if you will not stroke your face to be true to me'—that is, swear by Mahomet and his father's beard—'I must throw you into the sea, too!' The boy smiled in my face, and spoke so innocently that I could not mistrust him, and swore to be faithful to me, and to go all over the world with me.

"While I was in view of the Moor that was swimming, I stood out directly to sea," the story goes on to say. "But as soon as it grew dusk I steered my course that I might keep in with the shore, and made such sail that I believe by the next day at three in the afternoon, when I first made the land, I could not be less than 150 miles south of Sallee.

"It was not till I had sailed for five days, however, that I ventured to make the coast. We came to anchor in the mouth of a little river. I neither saw nor desired to see any people; the principal thing I wanted was fresh water."

CRUSOE BECOMES A RICH MAN

AND GOES AWAY ON A GREAT ADVENTURE

"WE came into this creek in the evening, resolving to swim on shore as soon as it was dark. Then we heard such dreadful noises of wild creatures that the poor boy was ready to die with fear, and begged not to go on shore till day. 'Well, Xury,' said I, 'then I won't; but it may be we may see men by day who will be as bad to us as those lions.' 'Then we give them the shoot-gun,' said Xury.

"But we were obliged to go on shore somewhere or other for water, for we had not a pint left in the boat. Xury said, if I would let him go on shore with one of the jars, he would find if there was any water, and bring some to me. I asked him why he would go? He answered me with so much affection that made me love him ever after. Said he, 'If wild mans come, they eat me; you go way.' 'Well, Xury,' said I, 'we will both go, and if the wild mans come we will kill them — they shall eat neither of us.'

"So I gave Xury a piece of rusk-bread to eat, and a dram out of our patron's case of bottles; and we hauled the boat in as near the shore as we thought was proper, and waded on shore, carrying nothing but our arms and two jars for water.

A SEARCH FOR WATER IN A STRANGE LAND, AND XURY'S DEVOTION

"I did not care to go out of sight of the boat, fearing the coming of canoes with savages down the river; but the boy, seeing a low place about a mile up the country, rambled to it, and by-and-by I saw him come running towards me. I thought he was pursued by some savage or wild beast, and I ran forward to help him. But when I came nearer to him I saw something hanging over his shoulders, which was a creature he had shot, like a hare, but different in color, and longer legs. However, we were very glad of it, and it was very good meat.

"But the great joy that Xury came with was to tell me he had found good water and no wild mans. But we found afterwards that we need not take such pains for water, for a little higher up the creek we found the water fresh when the tide was out; so we filled our jars and feasted on the hare, and prepared to go on our way."

After an encounter with a party of peaceable negroes, Crusoe coasted till he came near Cape de Verd, where he was picked up by a Portuguese ship bound for the Brazils. The captain proved very friendly, and, refusing to take anything from Crusoe, offered instead to buy both the boat and Xury. Crusoe was loth to sell the boy, but on the captain promising to give him his liberty in ten years if he turned Christian, and Xury saying he was willing to go, Crusoe let the captain have him.

CRUSOE MAKES A FORTUNE IN SOUTH AMERICA

After a good voyage they reached the Brazils. Here Crusoe entered into partnership with a sugar planter. He wrote to his friend the widow and asked her to send out one half of the value of the money he had left with her, in English goods, consigned to Lisbon, whence the Portuguese captain brought them to him on his next voyage to the Brazils.

Selling these goods to advantage, Crusoe started a tobacco plantation, and at the end of four years, being wealthy, but still unsatisfied, thought out a scheme whereby he might gain riches at even a quicker rate.

So he spoke to his fellow-planters and the merchants at San Salvador of his early voyage to Africa, and of how easy it was, in exchange for trifles, not only to get ivory, gold-dust, etc., but slaves for service in the plantations. And one day three of the planters came to him with a proposal that they should furnish a ship for such a purpose as he had outlined, and that he should go in it as a supercargo and do the trading.

HE PREPARES FOR AN ADVENTUROUS VOYAGE TO AFRICA

Unable to resist this offer, according to which he should have a share of the proceeds without providing any part of the cost, Crusoe made a will disposing of his plantations and effects in the event of his death.

"In short," he says, "I took all possible caution to preserve my effects and keep up my plantation. Had I

used half as much prudence to have looked into my own interest, and have made a judgment of what I ought to have done, and not to have done, I had certainly not have gone away from so prosperous an undertaking, and gone upon a voyage attended with all its common hazards, to say nothing of the reasons I had to expect particular misfortunes to myself. But I was hurried on, and obeyed blindly the dictates of my fancy rather than my reason."[1]

WRECKED ON THE DESERT ISLAND

ROBINSON CRUSOE ESCAPES A WATERY GRAVE

WHEN the ship in which Crusoe and his companions sailed from the Brazils had been about twelve days out, it was caught in a violent hurricane, and they were taken quite out of their reckoning. One of the men died of fever, and a man and a boy were washed overboard.

It was resolved to make for the West Indies, the vessel being in a very battered condition, when they were taken by another great tornado, and for twelve days together they could do nothing but drive before the wind.

While they were still at the mercy of wind and wave, one of the men espied land. The others had no sooner run out of the cabin to see where they were when the ship struck upon a sandbank, and, the waves breaking over her, they committed themselves, being eleven in number, to the boat, to God's mercy, and the wild sea. For though the storm had abated considerably, the sea ran dreadfully high.

After they had been driven about a league and a half, a raging wave, mountain high, took them with such fury that the boat was overturned, and its occupants were all swallowed up in a moment.

HOW CRUSOE WAS SAVED FROM THE SHIPWRECK

"The sea landed me," says Crusoe, "or, rather, dashed me, against a piece of rock, and that with such force that it left me senseless. And had it returned again immediately I must have been strangled in the water. But I recovered a little before the return of the waters, and got to the mainland, where, to my great comfort, I clambered up the clefts of the shore, and sat me down upon the grass, free from danger and quite out of reach of the water.

"I was now landed and safe on shore, and began to look up and thank God that my life was saved in a case wherein there was some minutes before scarce any room to hope. I believe it is impossible to express to the life what the ecstasies and transports of the soul are when it is so saved, as I may say, out of the very grave. I walked about the shore, lifting up my hands, and my whole being wrapt up in the contemplation of my deliverance, making a thousand gestures and motions which I cannot describe, reflecting upon all my comrades who were drowned, and that there should not be one soul saved but myself; for, as for them, I never saw them afterwards, or any sign of them, except three of their hats, one cap, and two shoes that were not fellows. I cast my eyes to the stranded vessel, as it lay so far off, and considered, Lord, how was it possible I could get on shore?"

THE FIRST NIGHT OF THE SHIPWRECKED SAILOR ON THE ISLAND

When, however, Crusoe began to look about him, his comforts began to abate. He was wet. He had no change of clothes. There was nothing to eat or drink. He had no weapon—nothing but a knife, a tobacco-pipe, and a little tobacco in a box. And night was coming on. All the remedy that occurred to him was to get up into a thick, bushy tree, like a fir, but thorny, that grew near, there to pass the night.

But first of all he walked inland a bit and, to his great joy, found fresh water, which somewhat revived him. Having drunk and put a little tobacco into his mouth to prevent hunger, he went to the tree, got up into it, and endeavored so to place himself that if he slept he might not fall.

He soon fell asleep. And so fatigued had he become that he did not wake till it was broad day. He then found that the storm had abated, and that the weather was clear.

CRUSOE'S LIFE IN HIS ISLAND HOME

AND THE BUILDING OF HIS FORTRESS

WHEN Crusoe awoke from his sleep in the tree, he saw that the wrecked ship had been lifted from the sandbank, and carried much further inland. At the ebbing of the tide he was able to get within a quarter of a mile of her. So, hoping to get some things from her that would be useful, he swam out, and by the help of a piece of hanging rope managed to clamber on board. A dog and two cats were the only living creatures left on board, and these became his companions.

HOW THE PROVISIONS AND CARGO WERE REMOVED FROM THE WRECK

There being no time to lose, he filled his pockets with biscuits, which he ate as he went about, and he made a raft. On this he fastened some seamen's chests. He filled these with provisions, tools, and ammunition, and then got his raft ashore.

The next day he again swam to the ship, and, making another raft, brought more stores ashore. For eleven days he kept returning to the vessel, and so brought away pretty well all that was on board. The next morning, when he left the hut he had made for himself on the shore, he looked out to sea, and, behold! the ship was no longer to be seen.

Then, finding a little plain on a rising hill of rock which commanded a good view of the sea, so that if any ship came in view he might be able to signal to her, he resolved to fix up a tent of sails here.

In front of where his tent was to be he drew a semicircle some twenty yards in diameter, and touching the rock at both ends. Along the edge of this semicircle he planted two rows of strong stakes, one six inches behind the other, driving them into the ground till they stood about 5½ feet above ground.

THE INGENIOUS DEFENCES OF CRUSOE'S ISLAND HOME

He sharpened the tops of the stakes, and filled the gap between them with cable from the ship, and then placed other stakes inside, leaning against the others, about 2½ feet high, like a spur to a post. He thus had a fence so strong that neither man nor beast could get over it. He left no door, but made a short ladder, which, when he was in, he lifted over after him.

Into this fence or fortress he, with infinite labor, carried all his riches, provisions, and stores. Having fixed up a kind of double tent, a smaller one within and one larger above it, he covered the whole with a large tarpaulin which he had saved among the sails.

Finding the rock behind—which was slightly hollowed out like the entrance to a cave—soft, he enlarged the hollow into a cave, and this he called his kitchen. His gunpowder he put into about a hundred bags, and put these into different parts of the rock, so that if any exploded it would not mean the loss of all his store.

In order that he might not lose his reckoning of time, he cut the following words on a large post: "I came on shore here on September 30th, 1659," and, making a kind of cross, set this up on the shore. On the sides of the post he every day cut a notch, making every seventh notch as long again as the rest to mark the Sundays.

HOW CRUSOE WAITED FOUR YEARS TO GET SOME BREAD

Meanwhile, he discovered that there were goats, rabbits, and wild cats on the island, as well as wild birds. Of every creature he shot he preserved the skin.

When his fortress was completed, he made some chairs and a table, having, for every board he wanted, to cut down a tree, hew it thin with an axe, and smooth it with an adze. Later, after a storm, parts of the old wreck were washed ashore, and he was thus provided with planks and bolts.

One day, just before the rainy season, he emptied what appeared to be a quantity of husks and dust from an old barley-bag on to the ground. After the rains he saw a few stalks of something green shooting up. Later, a number of ears of barley and rice came out. He saved these ears, and sowed them again and again; but it was not until he had been four years on the island that be ventured to use any of the grains to make bread.

He tells us of the precautions he had to take against the rabbits and birds who threatened his growing grain; how he was terrified by an earthquake,

which, however, caused no harm; how he fell sick, and, recovering, found comfort in the Bible he had brought from the ship; and how, going to the other side of the island, he found a fruitful valley, where he built himself a country seat or "bower."

In another part of the island he found abundance of turtles, wild hares, and fowls. He caught a parrot, and taught it to repeat his name. He caught a number of goats, and, breeding them in enclosures, was safeguarded against the failure of ammunition, and supplied with milk as well as meat, for the boiling of which he made some rough earthenware pots.

CRUSOE MAKES A CANOE AND GOES FOR A LONG SAIL

After he had been on the island for six years he made a canoe, in which he attempted to sail round the island, and was all but drowned. He made himself clothes out of the skins he saved, and became proficient in making baskets.

He gives us this sketch of himself in his new garb: "I had a great, high, shapeless cap made of goat's skin, a rough jacket of the same coming down to about the middle of the thighs, and a pair of open kneed breeches made of the skin of an old he-goat, and a pair of buskins. I had on a broad belt of goat's skin dried; and in a frog on either side of this I hung a little saw and a hatchet. At the end of another belt, which hung over my shoulder, hung two pouches, made of goat's skin, too. In one hung my powder, and in another my shot. At my back I carried my basket, on my shoulder my gun, and over my head a great, clumsy, ugly goat-skin umbrella. My beard I had cut pretty short, but on my upper lip I wore a large pair of Mahometan moustachios."

When not tending his plantations or his animals, Crusoe went out on short trips in his canoe or took walks about the island. Altogether, he found his time fully occupied.

THE MYSTERIOUS FOOTPRINT IN THE SAND
AND THE COMING OF MAN FRIDAY

ONE day, when he had been on the island for fifteen years, Crusoe was exceedingly surprized to see the print of a man's naked foot on the shore. He stood like one who had seen an apparition; then he fled back to his fortress like one pursued. That night he did not sleep. He did not stir out for three days and three nights for fear.

From the opposite side of the island Crusoe had seen a dim streak on the horizon. He took this for the mainland. He now concluded that the footprint had been left by some savages from the mainland, and proceeded to take great precautions for his safety.

When, some time later, he discovered a number of skulls and human bones, the remains of a cannibal feast, he hurried back to his dwelling with a feeling of thankfulness that he had been cast on a side of the island where the savages did not come. One morning, after he had been on the island for about twenty-three years, he was amazed to see a party of savages on his side of the island, and, going down to the shore after their departure, he found the remains of another cannibal feast. This caused him to redouble his precautions against discovery.

Some months later another wreck was cast up, and from this he obtained a quantity of new stores. Two years afterwards he was again alarmed by the arrival of another party of savages. They brought two prisoners. While they were cutting one up, the other ran away in Crusoe's direction. Three of the cannibals gave chase. Crusoe rescued the fugitive, who became his devoted servant. This incident taking place on a Friday, Crusoe called the black man Friday. He taught him many words of English, and the man became very useful and a welcome companion.

CRUSOE FINDS TWO MORE COMPANIONS, INCLUDING FRIDAY'S FATHER

One day Friday came running to his master in great alarm. A party of savages had arrived, and Friday was sure they had come for him. Comforting him as well as he was able, Crusoe armed himself and Friday, and sallied out from his castle.

When they came in sight of the savages, the latter were seen eating a prisoner, while another captive was lying bound upon the sand. This

captive was a white man. Crusoe and Friday fired upon the party, killing some and scaring the others. While Crusoe was attending to the white man, Friday found a third prisoner lying in the bottom of one of the canoes, and this captive proved to be his father. Crusoe now had three companions.

As soon as he was able to give an account of himself, the white man, a Spaniard, proved to be one of a band of seventeen who had been shipwrecked and cast among the savages of the nation to which Friday belonged. They were treated well; but shortly afterwards their friends went to war with a rival tribe, were beaten, and several of them, including the Spaniard and Friday's father, were taken prisoners.

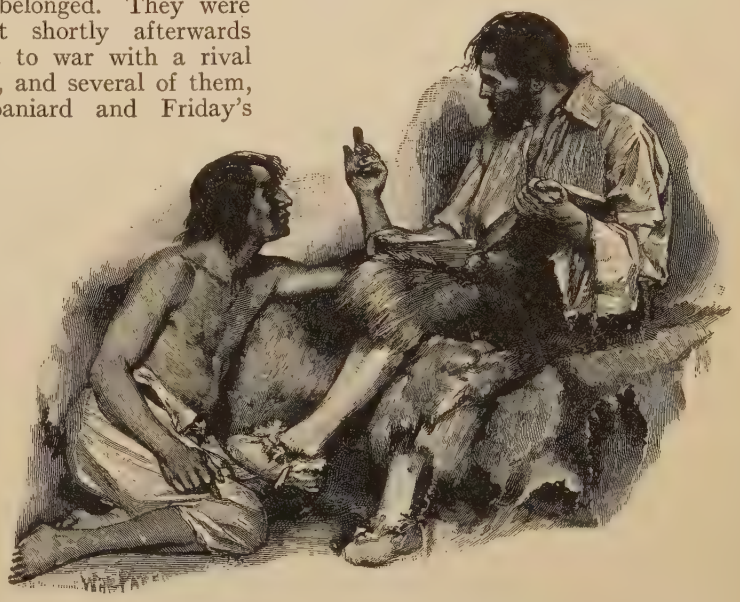
Crusoe and Friday had made a canoe before this occurrence, and it was decided that in this the Spaniard and Friday's father should bring the other Spaniards to the island.

After their departure an English ship came in sight. From this vessel a number of men landed near Crusoe's habitation. They brought three prisoners. At dusk, while the men were asleep, Crusoe approached the captives, and found that they were the officers of the ship. There had been a mutiny on board.

Crusoe released the three men, and after some exciting episodes the captain was restored to his ship, in which, after leaving the survivors of the mutineers on the island, Crusoe, taking Friday with him, left the island on December 19th, 1686, the same day of the month in which he made his escape from Sallee.

In this vessel Crusoe arrived in England on June 11th, 1687, after an absence of thirty-five years. Soon after he went to Lisbon, and he found out from letters that so well had his estate in the Brazils been managed that he was master of more than $25,000, and an estate worth about $5,000 a year.

Returning to England, Crusoe married, and settled down on a farm in Bedfordshire. But the old roving spirit came upon him again, and, his wife dying, he started out once more, revisiting his island, now a fairly thriving colony. He had many other adventures in China and Russian Tartary. Eventually, he reached London again on January 10th, 1705, after another absence of over ten years.



Robinson Crusoe, after being twenty-three years alone, was very glad to make a companion of the savage whom he had saved from the cannibals and had christened "Friday." Crusoe spent much of his time in teaching him English words with the aid of his Bible.

"And here," he says, "I resolved to prepare for a longer journey than all these, having lived a life of infinite variety seventy-two years, and learned sufficiently to know the value of retirement and the blessing of ending our days in peace."

Defoe really wrote three books about Robinson Crusoe, not only telling his life, but giving his thoughts on many things. The story we have just read is told in the first and most interesting of these books, which everyone who loves tales of adventure should read.

THE NEXT STORY OF FAMOUS BOOKS BEGINS ON PAGE 1333.

WHAT OUR LESSONS TEACH US

WE are getting on with our Reading now, for in these pages we are learning to read words of two syllables. In our Writing lesson we are thinking about letters which go above the lines that Nora and Tom call their crutches. Our Arithmetic lesson teaches us the names of the numbers from 10 to 19, and the Music lesson tells of the meeting on Bass Road. We draw the Union Jack and other flags in our Drawing lesson, and in our picture-stories in French we hear about the party's adventures on board the boat.

CONTINUED FROM PAGE 992

WORD-BUILDING

WORDS OF TWO SYLLABLES

SO far we have only been trying to read and pronounce words of one syllable. That is a long word, but its meaning is very easy to remember, for a word of one syllable is a word that can be spoken all in one sound, and with one effort of the voice, like BUT, MILL, DOG.

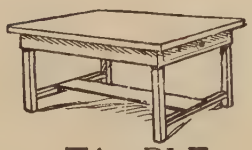
Now, if you add the letters TER to BUT you get BUT-TER, and BUTTER is a word of two syllables. You cannot say it as one sound; it wants two sounds. So, if you add the letters ER to MILL you get MILL-ER, the man who looks after the MILL. You must have played "There was a jolly MILLER and he lived by the Dee." And when, instead of calling out DOG, you say DOG-GIE, you are turning a word of one syllable into a word of two syllables. Now let us try a few more words that have two sounds, or syllables, in them.

DOL—LY

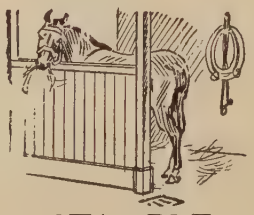
DON—KEY

MON—KEY

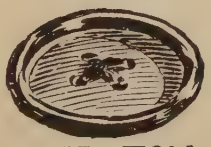
CA—BLE



TA—BLE



STA—BLE



BUT—TON

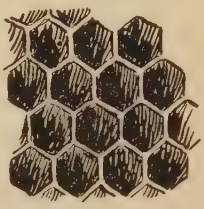
BER—RY

CHER—RY

We all know the old nursery rhyme, "Sing a Song of Sixpence." It is a very old favorite, and it is set to music on page 716. You remember how it says:

The was in his counting out his

KING COUNTING-HOUSE MONEY

The was in the eating bread and 

QUEEN PARLOR HONEY

So, you see, these longer words are not so very hard after all. But just let us read two or three more, to make quite sure that we can do them. You know all about Old Mother Hubbard, of course, and so do I. But I have often wondered—and I am sure you have, too—what happened after the poor dog had no bone because the cupboard was empty. Well, I think it was something like this:

When Old Mother Hubbard
Went off from the cupboard

The DOG said, "Now *I'll* have a try."

And there in a CORNER,
Just left by Jack Horner,

Was the crust of his lovely plum PIE.

And there was Miss Muffet, too. What happened to her afterwards? I think it must have been like this:

When little Miss Muffet ran off from her tuffet
And spilt all her curds and whey:
That wicked old SPIDER,

His mouth opened wider,
And tucked all the good things away.

PRIMARY READING LESSON

Little Bo-Peep has lost her sheep,
And can't tell where to find them,
Leave them alone and they will come home,
Wagging their tails behind them.

Little Bo-Peep, Little Bo-Peep!
Where are your sheep?
Little Bo-Peep!
You have lost your sheep.
Oh, Little Bo-Peep!

Little Bo-Peep, are you asleep?
Wake up! wake up!
Your sheep ran away.
You cannot find them.
Sleepy little Bo-Peep!

Little Bo-Peep lost her sheep,
She could not find them.
She thought they ran away.
No, no, they came back to Bo-Peep.

Your sheep are not lost,
They will come back,
They will come home again,
They will come to you.
Poor little Bo-Peep!

ACTION SENTENCES

Play you are Bo-Peep.
Run after the sheep.
Call your sheep.
Take your crook.
Go and find your sheep.

Copyright, 1910, by M. Perry Mills.

LITTLE BO-PEEP HAS LOST HER SHEEP

LITTLE Bo-peep
has lost her
sheep,
And can't tell where
to find them;
Leave them alone, and
they'll come home,
And bring their tails
behind them.

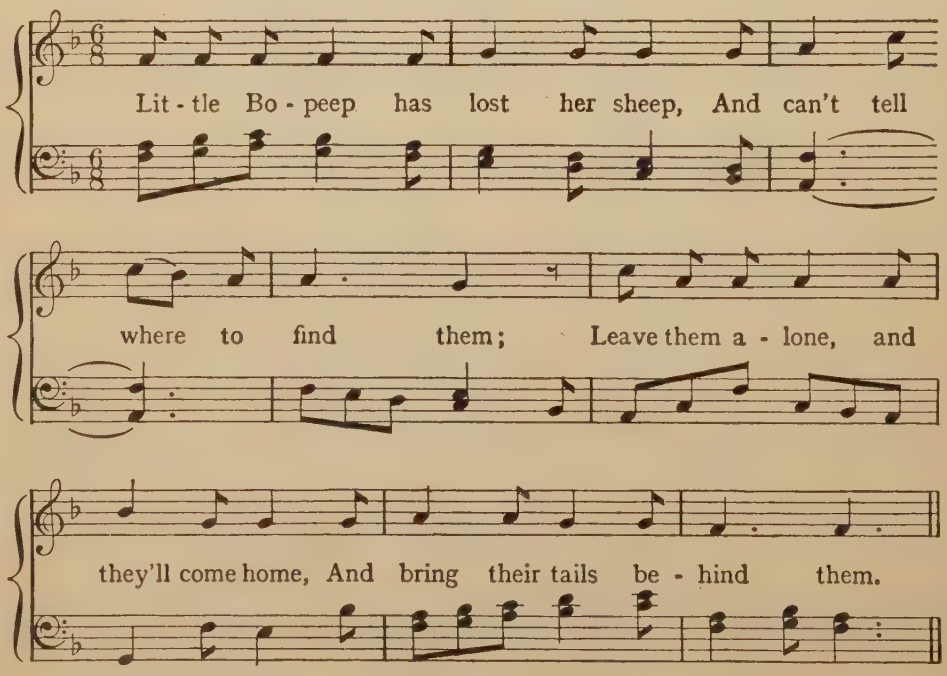
Little Bo-peep fell fast asleep,
And dreamt she heard them bleating;
And when she awoke she found it a joke,
For still they all were fleeting.

Then up she took
her little crook,
Determined for
to find them;

She found them, indeed, but it made her
heart bleed,
For they'd left
all their tails
behind them.

It happened one
day, as Bo-
peep did
stray
Into a meadow
hard by,
There she espied
their tails side
by side,
All hung on a
tree to dry.

She heaved a
sigh, and
wiped her eye,
Then went o'er hill and dale, oh;
And tried what she
could, as a shep-
herdess should,
To tack to each
sheep its tail, oh.


Lit - tle Bo - peep has lost her sheep, And can't tell
where to find them; Leave them a - lone, and
they'll come home, And bring their tails be - hind them.

LETTERS WITH LOOPS ABOVE THE LINES

WHEN their mother came to Nora and Tom she found they had already ruled their lines.

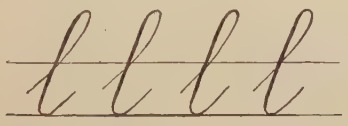
"Before we write any new letters," she said, "suppose you write all the letters you know. What are they?"

"I, u, n, m, o, c, a, e, r, v, w, x, s."

"Thirteen," said Tom, counting them. Nora said there were twenty-six letters in the alphabet, so that they knew just half of them, because twice thirteen is twenty-six.

Their mother was pleased with the rows of letters, and put the papers aside to show father later on.

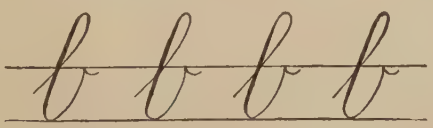
"You have never written outside the lines," she said. "To-day we shall make letters that go above the line as well as inside them. This is the first—l, and you see it has a long loop, then a long down-stroke, and it ends in a pot-hanger."



"It is a big letter, mother," said Nora; "just twice as tall as the others. It looks as if it were trying to grow up and up and off the paper."

"The loop is difficult," said Tom, as he tried to make a nice one. But he had not noticed that the loop had to end on the down-stroke where both touched the line, and when he always did that he no longer made bad loops.

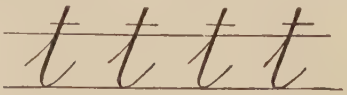
"L begins loop," said their mother, "so that will help you to remember the first tall letter. There is another letter with a loop made like l, but it ends in a curly tail, just like v. It is b, and it is made like this."



Tom and Nora found b easy to make after writing l, and they understood why their mother was so particular about their making l very carefully.

"I helped us to make u," said Tom, "and now l and v help us to make b."

"The next letter is t, and it is quite easy for you now," their mother told them, as she wrote some to be copied. "It has no loop like l and b; its top is only half the height of the loops you have made, and it is crossed by a little line like this."



"You remember we said that each little i has its own little eye? Well, every t carries its own little cross, and if we don't cross t, the letter changes into something else—into what do you think?"

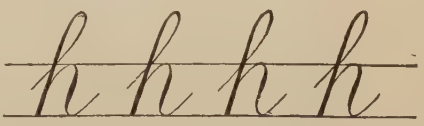
Nora guessed quite right, for she said l without a loop. Tom was thinking of something else. He had seen his father's T-square, and remembered being told it was called a T-square because it was like the big letter T.

"But this," said his mother, "is a little t; and the cross-stroke cuts through the upper part. The big T is just like a T-square, and has the cross-stroke on the top."

After writing t, the children were shown how to make h.

"Now, Nora," said her mother, "how am I making h?"

Nora looked while her mother wrote h, and thought the first part looked like l, but the second part like the second part of the letter n.

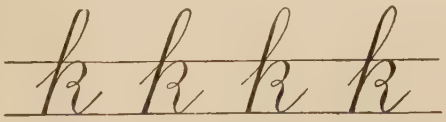


"True," said her mother. "Take care to keep the pencil on the paper when you run up the down-stroke again, to make the pot-hook and the pot-hanger, and let the loop be just as tall as those of l and b."

H took Tom some time to make nicely, but he soon discovered what Nora had said was true, and then he made really nice h's.

"The last letter to learn to-day," said their mother, "has a poor crooked back, but it is a very useful letter, and belongs to kitty, though kitty cannot make her back quite so crooked.

You will think it very like h—h with a twist in its back. Here it is—k."



When Tom began to make k he very much wished it had a nice straight back like h, and no loop turned to the left in the middle of it.

But Nora said she liked writing k. She thought it was much prettier than h.

"Next time," said their mother, "we will write d, g, and q. I am sure father will be pleased with the way you have written your thirteen letters."

ARITHMETIC

NAMES OF THE NUMBERS FROM 10 TO 19

AT last we know enough to be able to learn the *names* of some numbers bigger than twelve.

Suppose we take twelve pencils and arrange them as we did in the last lesson —that is, make a bundle of ten pencils for the left-hand box and put the two other pencils in the right-hand box. Remember that the figures which stand for twelve will then be 12.

Next, we are to find out how many pencils we shall have if we get *one more than twelve*. Well, it is clear that we must put this one more pencil into the right-hand box with the other loose pencils. But how many pencils will there be in that box now? Three. So that, instead of having a figure 2 on the box, we must now alter it to a 3.

This tells us that the figures which stand for the next number after twelve are 13. All we want now is a name for it. As there are *three* things in the right-hand box and a bundle of *ten* in the other, we call the number *thirteen*, which is something like three-ten.

To get the next number after thirteen, we put one more pencil into the right-hand box. That will make *four* pencils in that box now, and the figures on the boxes must be 1 4. So now, instead of having *three*-ten, we have *four*-ten, and we call the new number *fourteen*.

We can go on in the same way, putting one more pencil into the right-hand box each time, and get the names of the numbers after fourteen.

First we have *fifteen* (which is *five*-ten), then *sixteen*, *seventeen*, *eighteen*, *nineteen*. The figures which stand for them will be 15, 16, 17, 18, 19. We do not put any more pencils into the right-hand box after we have nine in there, because another pencil would be enough to make a new bundle of ten, and we should tie them together and put the bundle into the left-hand box.

This, then, is what we have found:

One more than twelve is called *thirteen* (13).

One more than thirteen is called *fourteen* (14).

One more than fourteen is called *fifteen* (15).

One more than fifteen is called *sixteen* (16).

One more than sixteen is called *seventeen* (17).

One more than seventeen is called *eighteen* (18).

One more than eighteen is called *nineteen* (19).

To help us to remember the names of these new numbers we will answer a few questions like those in Lesson 3.

Jack had a box of soldiers with 9 soldiers in it. He had another box given him containing 8 soldiers. How many soldiers had he altogether?

There are 9 in the first box. Begin the second box by saying "ten," then "eleven," and so on. By the time you have counted each soldier you will have said "seventeen."

How many do 9 and 8 make? Seventeen (17).

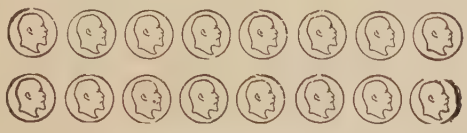
There are eleven swallows sitting on a telegraph wire, and eight more on the wire next to it. How many swallows are there altogether?

How many do 11 and 8 make?

A boy learned six lines of poetry one day and nine lines the next day. How many lines is that altogether?

6 and 9 make how many?

Harry had sixteen pennies in his money-box. If he spends five, how many will he have left?



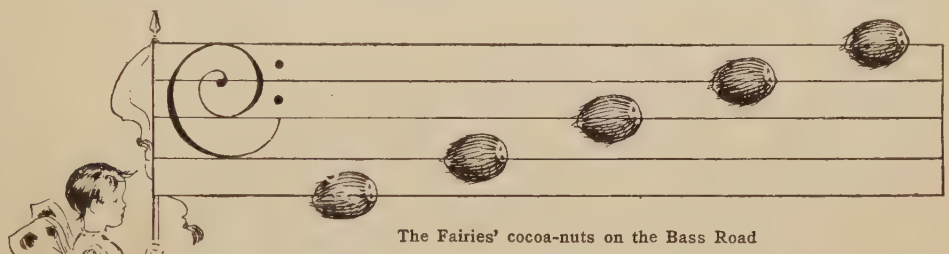
Count the pennies first and see that there are sixteen. Then count five, and take them away. Count those which are left.

5 taken from 16 leave how many?

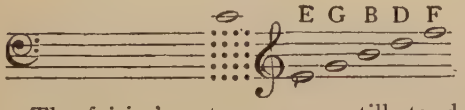
In the next lesson we shall learn some of the numbers which come after nineteen. You remember that when we get more than nine things in the "loose pencil" box we are able to make another bundle of ten and put them in the "bundle" box; and we have not had anything yet about numbers which have more than one bundle in the "bundle" box.

THE FAIRY MEETING ON BASS ROAD

"MAKE way! Make way! Make way!" cries little Bass Clef, for his road is to be the scene of a fairy meeting to-day, and he has been up and about since early morn to see that nothing is wrong with the motor-lines, and to be ready to tell you and me what is happening. Treble Clef has told him what a success her fairy procession was, and he is quite determined that the Bass Road Meeting shall succeed just as well. Here is an illustration of the two roads to show you how very close they are together. In fact, it is like one long road, half of it bearing one name and half of it bearing another, while Fairy C's middle house is situated in the very centre:

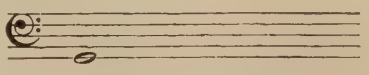


The Fairies' cocoa-nuts on the Bass Road

Fairy C

The fairies' motor-cars are still standing in their proper places in the Treble Road, so little Treble Clef is still on duty, and Bass Clef has now taken up his position at the entrance of his road, to tell us what the fairies are doing down there.

These little people have many games of which they are very fond, and they have many different ways of carrying out their various plans; sometimes they will tell their little guides, but at other times they just take them by surprize.

To-day Bass Clef has to wait very patiently. There are the motor-lines, there stands our little guide, but, so far, all is silent. Suddenly he sees what looks like a cocoa-nut on the first motor-line:



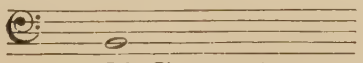
Fairy G's cocoa-nut

As quickly as possible he beckons to you and me to run to the piano and call on Fairy C in the middle house. We press the panel of her door, and find her quite ready to help us. She says we are to pass by the nine little white doors lying to the left of this particular house of hers, and when we come to the tenth we are to press it

very firmly and we shall hear something we want to know. Press it down and listen. This time we hear a deep voice, for there is something about this road that makes fairy and goblin voices very deep indeed.

On line number one you surely can see
A cocoa-nut dark—it holds Fairy G.

Yes, Fairy G has come first, and has told little Bass Clef that to-day she and her friends are arriving in cocoa-nuts. Fairies like to have ways of their own, and they know it will be a surprize to you and me, because, somehow or other, we have never tried to ride in a cocoa-nut, have we? But while you and I have been talking, the fairies have not been wasting their time. Look! another cocoa-nut has made its appearance:

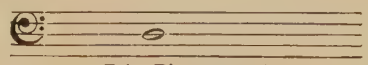


Fairy B's cocoa-nut

"You must go to the piano again," whispers Bass Clef, "and this time press the door which is next but one to the right of Fairy G, who has just been singing to you." Again we listen, and this time we hear Fairy B's voice:

Cocoa-nut does what I want her to do,
It shows you B's home on line number two.

Yes, for some reason or other the fairies have made up their minds to be very mysterious to-day, and even Bass Clef cannot foretell their coming. For one minute there is nothing to be seen; the next moment another cocoa-nut, the fairy's strange carriage, is on its line:

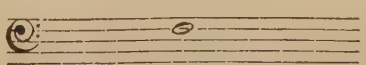


Fairy D's cocoa-nut

See! here is a third one, and Bass Clef has just said we must go to the next door but one to the right of the house we have just visited, and if we press it gently we shall hear Fairy D's voice. This is her little song:

Cocoa-nut dear, your friend Fairy D,
Very much wants the line number three.

Hardly has she sung this little rhyme when we find a fourth cocoa-nut has arrived:

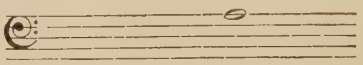


Fairy F's cocoa-nut

Again we must hasten to the piano and call at the next door but one to the right of Fairy D, pressing it just as we have pressed the other doors. We hear Fairy F's low voice:

On line number four I'm waiting to-day,
'Tis Fairy F's voice, what more need she say?

"The fifth cocoa-nut!" whispers Bass Clef, who is quite astonished at the new game of the fairies:



Fairy A's cocoa-nut

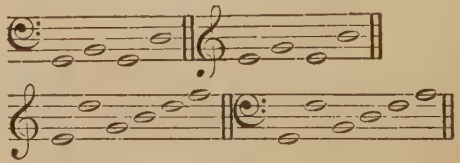
However, sure enough, here is the fifth cocoa-nut, and inside it dwells a fairy. Once more we must run to the piano to find out all about it. Bass Clef says we must go to the next door but one to the right of the house where we have just heard Fairy F's voice. Press the door very gently and listen. Fairies never keep us long, and this time it is Fairy A who sings to us:

Fairy A's nut could not roll very fast,
But line number five is now reached at last.

"What a funny day we have had!" says our friend Bass Clef, and you and I think so too, and to make it funnier still the fairies have been making up a rhyme while sitting in their cocoa-nuts in the Bass Road, and here it is for you and me to read:

The first line, children, as you see,
Was taken by the Fairy G;
When B came up the second line,
"The third," said Fairy D, "is mine."
The fourth was Fairy F's; and last
The Fairy A went singing past:
"My line's the fifth," she sang, "so I'm
Not really late, but just in time."

This time we have two little puzzles, and we will see how quickly we can find them out.



You see, the fairies in both roads are having a game of play. They want us to find out their names very quickly, and directly we discover each fairy we must go to her home on the piano, wherever it is, and press down the note. Then she will sing to us.

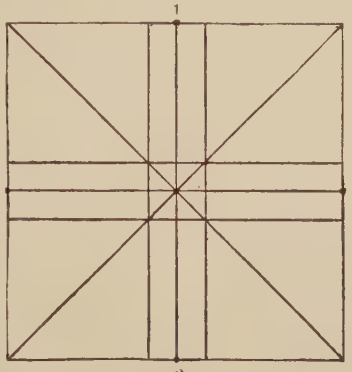
HOW TO DRAW STRAIGHT LINES

A LITTLE while ago we drew an envelope; now we are going to draw a square. It has four straight lines, all of the same length.

We shall want a sheet of white paper, a B pencil, a piece of soft indiarubber, a flat ruler with inches marked on it, some red chalk, or a paint-box with brushes and water.

Fasten the paper to the board, and have your pencil sharpened with a chisel-point.

Now look at your ruler, which is marked 1, 2, 3, and so on. Each of these divisions is one inch. Put the ruler away, and see if you can make a little line from memory exactly an inch long. Get the ruler again, and see if your line is the right length.



In drawing the cross of St. George, see that the lines are straight and "true."

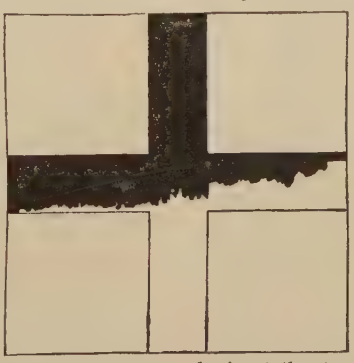
Now look well and see how long the ruler is from one end to figure six—that is, six inches. Put the ruler away again, and see if you can draw, from memory, a line six inches long, then measure with the ruler to see if it is right, and make it a little longer if it is too short, or rub out what is not wanted. Try to draw a square—that is, three more lines all the same length, six inches long, and all joining at the corners. Hold your pencil well down, away from the point, and use the side of the point—not the tip.

Take the ruler again and place it against each line—without ruling a fresh line—to see whether yours are very crooked. If so, try to alter them, but if they are very wrong draw a fresh square. If you rub paper too much it spoils the surface, and the drawing looks untidy; besides the pencil will not work properly after indiarubber has been used too much, and one cannot paint on dirty, rough paper.

When we have a good square, we must draw lines from corner to corner, crossing at the centre; then draw lines from side to side, both ways, also crossing at the centre, where the other lines crossed. It is a good plan to put dots on the sides immediately opposite the centre before you draw the lines from side to side.

Now draw lines on each side of the lines, downwards and across the square from side to side—not the lines from corner to corner — as you see in the illustration. You will have a cross now in the middle of the square, and if the lines are straight we can paint this cross bright red, like the cross of St. George of England and the cross which the Army nurses wear as a badge. Perhaps you have seen it painted on the ambulance sides. Rub out all the other lines before you begin to paint. Rub very lightly, or else you will rub the surface of the paper away, and then the paint will sink in and look untidy, instead of lying smooth and even.

If you have rubbed out a good deal in trying to make it right, do not try to paint it at all, but draw a better one. Use plenty of wet color, unless you prefer to use red chalk.



To paint the cross, begin at the top, using wet color, and paint downwards.

When we have finished this, we should try to draw another shaped cross in another square, and paint it a different color. If we look at the Union Jack we shall find it; it is called the cross of St. Andrew, and he is the Scottish saint.

There is an Irish saint, too, called St. Patrick, and he has a cross of his own. If we do all these, we shall get plenty of practice in straight lines and coloring.

We must also remember how to put on a flat wash. We shall not find this at all difficult, because we learned all about it in our second lesson.

LITTLE PICTURE-STORIES IN FRENCH

IN our story this time, which is continued from page 992, we read how the party spend their time on the boat. Remember that the first line under each picture is the French, the second gives the English word for the French word above it, and the third line shows how we make up the words into our own language.

Nous quittons l' Angleterre.
We leave the England.
We are leaving England.

Tout le monde contemple la côte.
All the world looks at the shore.
Everyone looks at the shore.

Il fait très beau temps.
It makes very fine weather.
The weather is fine.

Nous ferons un bon voyage.
We shall make a good voyage.
We shall have a good voyage.

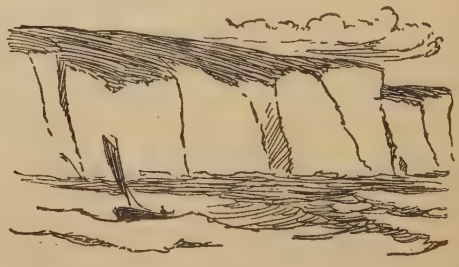
Maman n'aime pas la mer.
Mamma likes not the sea.
Mamma does not like the sea.

Cela la rend malade.
That her makes ill.
It makes her ill.

Elle descend dans la cabine.
She goes down into the cabin.
She goes down into the cabin.

Nous restons sur le pont avec papa.
We stay on the deck with papa.
We stay on deck with papa.

Il y a beaucoup de falaises.
It there has many of cliffs.
There are many cliffs.



Nous aimons beaucoup la mer.
We like very much the sea.
We like the sea very much.

Jeannette voudrait voir des poissons.
Jenny would like to see some fishes.
Jenny wants to see some fishes.

Nous croisons un bateau à voiles.
We pass a boat to sails.
We pass a sailing boat.

Il y a un homme dans le bateau.
It there has a man in the boat.
There is a man in the boat.

Il va attraper des poissons.
He goes to catch some fishes.
He is going to catch some fish.

Bébé dit: "Un bateau comme le mien!"
Baby says: "A boat like mine!"
Baby says: "There is a boat like mine!"

La dame au perroquet est malade.
The lady to the parrot is ill.
The lady with the parrot is ill.

Le perroquet est tout seul.
The parrot is all alone.
The parrot is all alone.

Nous courons à la cage.
We run to the cage.
We run to the cage.

Le perroquet est en colère.
The parrot is in anger.
The parrot is angry.

Nous essayons de le faire parler.
We try of him to make to talk.
We try to make him talk.

Il dit: "Va-t'en!"
He says: "Go thou from it!"
He says: "Go away!"

Quelqu'un dit: "La terre est en vue."
Somebody says: "The land is in sight."
Somebody says: "Land is in sight."

Maman se sent beaucoup mieux.
Mamma herself feels much better.
Mamma feels much better.

LITTLE PICTURE-STORIES IN FRENCH

First line: French. Second line: English words. Third line: As we say it in English.

Pauvre Jeannette elle est malade. C'est tout à fait ma faute. J'en suis bien fâché.
Poor Jenny she is ill. This is entirely my fault. I of it am well sorry.
Poor Jenny is ill. It is all my fault. I am very sorry.

Hier maman nous a conduits au Louvre pour voir les tableaux.
Yesterday mamma us has conducted to the Louvre for to see the pictures.
Yesterday mamma took us to the Louvre to see the pictures.

Les galeries sont très longues et glissantes. C'est bien la place pour glisser.
The galleries are very long and slippery. This is very the place for to slide.
The galleries are very long and slippery. It is just the place for sliding.

Jeannette et moi, nous avons glissé d'un bout à l'autre de la salle.
Jenny and I, we have slid from one end to the other of the room.
Jenny and I slid from one end of the room to the other.

Maman a crié: "Prenez garde!" Il était trop tard. Jeannette était tombée.
Mamma has cried: "Take care!" It was too late. Jenny was fallen.
Mamma cried: "Take care!" It was too late. Jenny had fallen.

Elle n' a pas pu se relever. Elle a crié: "Ma jambe! Ma jambe!"
She (not) has not been able herself to raise. She has cried: "My leg! My leg!"
She could not get up. She cried: "My leg! My leg!"

Un monsieur a dit à maman: "La petite fille s' est-elle fait mal?"
A gentleman has said to mamma: "The little girl herself is she made ill?"
A gentleman said to mamma: "Has the little girl hurt herself?"

"Je crains que la jambe ne soit cassée." Le monsieur a examiné la jambe.
"I fear that the leg not be broken." The gentleman has examined the leg.
"I am afraid that her leg is broken." The gentlemen examined the leg.

"Elle s'est foulé le pied. Elle ne doit pas marcher pendant quelque temps."
"She herself is sprained the foot. She (not) must not to walk during some time."
"She has sprained her foot. She must not walk for some time."

Nous l'avons mise dans une voiture, et nous sommes retournés à la maison.
We her have put into a carriage, and we are returned to the house.
We put her into a carriage and returned home.

THE NEXT SCHOOL LESSONS BEGIN ON PAGE 1465.

WHAT THIS STORY TELLS US

WHAT is it that makes us feel alive? What is it in the air that we breathe that builds up our strength, that gives life and movement to a boy or a girl or a flower or a bird? What the first great cause of all things is no man can understand, but we know that the things that make us alive, the things that make an oak-tree grow from an acorn, the things that make a skylark grow from an egg, the things that make a balloon go up in the air, the things that bring back our strength when we recover from an illness, are wonderful gases. How the gases get their remarkable power we do not know, but we know something of the way in which they work in the world and of the things that happen when they come together. Here we read of the three most important gases—hydrogen, oxygen, and nitrogen. Hydrogen and oxygen together form water; oxygen and nitrogen together make the air.

THREE WONDERFUL GASES

CONTINUED FROM P. 1104

LET us remind ourselves of what we already know. When we examine all the stuff of the world we find that it is made up of about eighty kinds of matter which we call elements. Each of these is made up of tiny parts called atoms. All the atoms of any one element are just the same, whether they are found in a star or on the earth. Everything that marks the element, everything in which it differs from another element, depends upon the nature of the atoms of which it is made. Hydrogen differs from oxygen or from gold because the atoms of hydrogen differ from the atoms of oxygen or the atoms of gold.

The study of an element, then, is really the study of its atoms. We must always remember that everything which is said about hydrogen in general really depends upon the character of the atoms which make it up, and this is true in the case of all the elements. We will begin with hydrogen, because the atom of hydrogen is the simplest, smallest, and lightest of all the eighty or eighty-five kinds of atom that we know. If we remember this, we shall understand many things—as, for instance, the reason why hydrogen is used for filling balloons.

When an element is found anywhere in the world by itself, and not as part of a compound with some other element, we may say that it is found *free*. Oxygen, for instance, is found free in the air; gold is found free. This does not mean that people will give sovereigns away for nothing, but that gold, like oxygen, is found free in the sense that it is found by itself. Now, the first thing to notice about hydrogen is that only in very rare and peculiar cases can it anywhere be found free. It goes to make up about one hundredth part of the matter of the earth so far as we know it. But in order to find this out we have to split up all sorts of compounds, and find hydrogen in them. The reason why hydrogen is not found free, but practically always in combination with some other element, is that it has a very great power of combining with other elements, so that, wherever it is, it links itself with them, and so ceases to be free.

There is one element for which hydrogen has a tremendous attraction, and that is oxygen. We know that the product which results from this attraction between oxygen and hydrogen is water. There is a great abundance of oxygen almost everywhere, and as there is much more than enough oxygen to combine with all the hydrogen that there is, it follows that we cannot find free hydrogen, but that wherever we turn we find it in combination with oxygen.

So powerful is the attraction of hydrogen for oxygen that free hydrogen is the best fuel in the world.

Copyright, 1908, by Amalgamated Press, Ltd.

More heat and power can be got by burning it—that is to say, by combining it with oxygen—than by burning anything else, only, of course, it is a very expensive fuel, because it requires a great deal of trouble to get free hydrogen away from the other elements with which it is combined.

THE SPLITTING UP OF WATER INTO THE THINGS IT IS MADE OF

So now we must learn one or two of the ways in which it is possible to get free hydrogen. Plainly, we must take some compound in which hydrogen is contained, and we must do something to it so that it shall be broken up and enable us to get the hydrogen by itself. Well, the cheapest compound that we can use is water. We pass a current of electricity through water, and if we do this in the right way we split the water up into the two gases, hydrogen and oxygen, of which it is made, and can collect them separately in tubes. There is a special word for this process, which is like many other processes that chemists employ every day. The word is very long, but we can explain it quite easily.

Water is *compounded*, or composed, of oxygen and hydrogen. So, when these two unite to form water, the process is called *composition*. Then, if water is split up again into them, the process is called *de*-composition. The syllable *de* in this word, as in very many words, simply means back, or opposite; *de*-composition is simply the opposite of composition. So, when we take any compound, such as water, and split it up into the elements of which it is composed, we say that we have decomposed it, and we call the process decomposition. If you remember what we have said about water and about the long ages during which men thought that it was an element, you will understand that the decomposition or splitting up of water into the real elements of which it is made was one of the greatest discoveries in the history of chemistry.

HYDROGEN, THE FREE GAS THAT FLIES UPWARDS AND CANNOT BE SEEN

There are many other ways in which water can be split up, but it will be enough for us to remember that the passage of an electric current through water will do this. There is also a very large number of ways in which other compounds containing hydrogen can be split up, so that we may obtain the hydrogen which is in them; but we need not trouble ourselves with these. Just one simple thing we must remember; it is that hydrogen from water, and the hydrogen from any of its other compounds, and the hydrogen which we have discovered in many of the stars, is always one and the same. The reason is that all hydrogen is made up of exactly the same kind of atoms.

Hydrogen, then, as we can study it in its free state, is an invisible, colorless gas, looking just like air, which is a mixture of invisible, colorless gases. This means, of course, that it looks like nothing at all, for invisible simply means "cannot be seen." Hydrogen is the lightest of all known substances. We can get some idea how light it is when we learn that water is 11,160 times as heavy. It is far lighter than air, and when it is let loose in air it flies upwards. It is an easy and interesting experiment to pour hydrogen *upwards*, from one jar to another. It has no smell. It can be breathed for a little while without any harm being done, but one might as well not be breathing at all, and the hydrogen must soon be stopped, and air, or oxygen itself, be breathed, if life is to continue.

HYDROGEN CAN BE FROZEN SOLID SO THAT WE CAN SEE IT

Sir James Dewar, of the Royal Institution in London, has, within the last few years, been able to take hydrogen, which is usually a gas, and to make it liquid. In order to do this the hydrogen must be made very cold, and must be pressed together, or, as chemists say, subjected to high pressure. Liquid hydrogen looks like water, just as liquid air does. If it is made still colder, it is frozen. Solid hydrogen looks like solid water, or ice, just as does solid or frozen air. Solid or frozen hydrogen is the coldest of all substances known; in other words, it has the least temperature; it contains the least amount of heat. If it were only a very little colder, we know that it would contain no heat at all, and in London and Leyden men are now working in the attempt to get out of it the little heat that remains in it, so as to find out what we can only guess at now—what matter is like when it contains no heat at all.

Besides the fact that water is a compound of hydrogen, and therefore that hydrogen must be found in all living matter, this element also occurs combined in other ways in all living matter or protoplasm everywhere. Even if water were not necessary for life, or if there were no hydrogen in water, there could be no life without hydrogen.

This gas, of course, burns readily in the air. The product of this burning is nothing but water. The word hydrogen simply means *water-maker*. Besides combining with oxygen, it combines with almost every other element, and we shall have something to say later about some of its compounds.

OXYGEN, THE ELEMENT WHICH HELPS TO MAKE HEAT AND LIGHT

Oxygen, the second element composing water, is sixteen times as heavy as hydrogen, and as we use the capital letter H to represent hydrogen in chemistry, so we use the capital O for oxygen. Like hydrogen, this is a colorless gas, having neither taste nor smell; it can only be dissolved in water to a very slight degree, but that slight degree is necessary for all the life that is in water, since life cannot use the oxygen that goes to make water, but only the tiny proportion of oxygen dissolved in water when it *is* made.

When put under pressure and made very cold, oxygen can be made liquid or even frozen. In these conditions it looks just like water or ice. This is an intensely active element, and readily combines with most of the other elements. When it does this the substances with which it combines are said to be burnt, or we say that the process is one of combustion. Heat is always produced when oxygen combines with another element, and usually light is produced as well. The heat of our own bodies is so produced.

THE GREAT IMPORTANCE OF PURE OXYGEN IN MANY WAYS

Sometimes when something is burnt very slowly indeed we may not notice any production of heat, but if we look very carefully we shall find that this occurs. For instance, when iron rusts, the surface of it is, to some extent, burnt, or combined with oxygen, and if we examine rusting iron very carefully we find that it becomes a little warmer than its surroundings.

So important is the process of burning, or adding oxygen to anything, and the opposite process of taking oxygen away from anything with which it is combined, that we have special names for both of these processes. When anything is burnt or combined with oxygen, we say that it is oxidized, and the process is called *oxidation*. On the other hand, when oxygen is taken away from any compound, so as to leave by itself the thing with which it was combined, we say that that thing has been reduced, and the process is called *reduction*.

For a great many purposes we require nowadays to use pure oxygen instead of air. Burning occurs much more quickly with pure oxygen than with air, as is natural, and so, when we want to produce a very high temperature, we use pure oxygen instead of air. You have often seen what is called a magic lantern. Usually nowadays the light that throws the picture on the screen is obtained by making a piece of lime very hot so that it glows, and the best way of making it hot enough is to have two pipes, one containing hydrogen and the other oxygen, and to burn the hydrogen with the oxygen.

OXIDATION MEANS ADDING OXYGEN; REDUCTION IS TAKING IT AWAY

This produces such tremendous heat that the lime gives out a brilliant light when exposed to it. Also, pure oxygen is used for invalids to breathe sometimes, instead of air. It is very important that this should be pure, and the best way to get pure oxygen—though perhaps it is rather expensive—is to separate it from liquid air. All the oxygen which is used for the hospitals at present is now obtained from liquid air, and is as pure as it can be. When used for other purposes oxygen does not require to be so pure, and is obtained in other ways, which cost less.

We must particularly remember the words *oxidation* and *reduction*, and what they mean. It is scarcely possible to speak or write about any part of chemistry for two minutes without the use of one or both of these words.

After talking about water, the most important compound in the world, we described the two wonderful gases, hydrogen and oxygen, of which it is really made; and oxygen, we know, forms about one-fifth part of that

mixture of gases which we call the air. We must say a little here about another wonderful gas—nitrogen, which makes up almost all the rest of the air. Like oxygen and hydrogen, it is a colorless gas, without any taste or smell, and, like those two gases, it can be turned into a liquid or even frozen when made cold and put under pressure. Only a very little of it can be dissolved in water.

NITROGEN, THE QUIET ELEMENT IN THE AIR THAT PUZZLES THE CLEVEREST MEN

Though it is immensely important, and though life could not exist without it, nitrogen is a very quiet, inactive sort of element; very different from oxygen, which attacks almost everything and combines with it, or from hydrogen, which is so fond of oxygen that hydrogen by itself can scarcely be found anywhere. Nitrogen, on the other hand, attacks no other element, as a rule, and no other element attacks it.

Thus nitrogen and oxygen live together in the air, so to speak, without doing anything to each other. When we breathe air, we breathe nitrogen, and there is a good deal of nitrogen in the blood of every one of us, but it does nothing there. Every living creature must have nitrogen in its body, not by itself, but in the form of compounds; but few living creatures can use the free nitrogen of the air.

As we go on living, or as a tree goes on living, we use up the compounds of nitrogen which help to make the body, and so we must have more of these compounds if we are to go on living. But though we are living in an air that is mostly nitrogen, and are breathing it into our blood, and though the tree is living in this same air, yet neither we nor the tree can make any use of the nitrogen of the air.

THE COMPOUND OF NITROGEN & OXYGEN THAT STEALS OUR FEELINGS

We have to get the nitrogen that we need in the form of compounds in our food. In the long run we get these from the tree, or from some kind of vegetable, such as wheat—which is a sort of grass—but the grass and the tree are themselves dependent, so far as we can discover, upon certain kinds of tiny microbes which *are* able to help themselves to the nitrogen of the air itself and to use that.

If we take some trouble, we can make nitrogen combine with other things, though we have not yet learnt how to make for ourselves any compounds of nitrogen which we could use as food. We need only mention two of the compounds of nitrogen which we can make. One is a compound of nitrogen and oxygen, and was discovered about a hundred years ago in England by the great man Davy, who also invented the miners' safety lamp. The common name for this compound is laughing-gas. If we breathe it we become unconscious for a little while, so that the dentist can take out a tooth without our feeling anything. Sometimes people get rather excited and laugh a good deal when they take this gas, and that is the reason for its name.

Ammonia is the other compound of nitrogen which we may mention here. It is also a gas, and is a compound of nitrogen and hydrogen. We commonly think of ammonia as a liquid, but that is quite a mistake. What we call ammonia or liquid ammonia is really a solution of ammonia in water.

HYDROGEN, OXYGEN, & NITROGEN ARE THE MOST IMPORTANT GASES

Ammonia is colorless, like oxygen and hydrogen and nitrogen; but, unlike them, it has a very powerful effect upon the nose. It excites the whole body when we breathe it, and what we call smelling salts is really something that gives off ammonia for us to breathe when we feel faint. Though water dissolves so very little of either hydrogen or nitrogen, it will dissolve an astonishing amount of ammonia, and it is in that form that ammonia can be sold. It is a very powerful and active gas, and the solution of it in water is therefore very useful for cleaning things.

These three gases, hydrogen, oxygen, and nitrogen, the first two of which are *combined* to form water, and the second two of which are *mixed* in the air, are the three most important gases in the world.

But we should remember that air also contains other gases, though only a very little of any of them. It contains a certain amount of carbon dioxide which is a compound of carbon and oxygen; it contains a little ammonia, some of which is washed out of it by the rain; and it also contains a few rare elements which do nothing in particular, but are interesting for many reasons.

THE NEXT STORY OF THE EARTH BEGINS ON 1313.

MAKING A BALL OF MANY COLORS

CONTINUED FROM 1104

A CAPITAL ball may be made from a little piece of cardboard and some wool. You can make one as small as a walnut or as big as a football. It all depends upon the size of the card you use.

Suppose one just a nice size to handle is wanted. For that a round piece of cardboard, four inches wide, is needed. In the middle of the cardboard cut a hole. This must be quite round, and should be about 1½ inches across. The card should always be about three times as wide as the hole in the middle.

If the ball is to be all one color, unwind a good long piece of wool. Then put one end of it through the hole in the middle of the card. Bring this end up to the edge of the card, and hold it there with the finger. Now go on putting the wool through and through the hole, and binding it round the card. It should not be pulled too tight, nor left too loose. Round and round the card the wool is twisted, each time being put through the hole in the centre.

Threading the wool through the hole

Cutting the loops

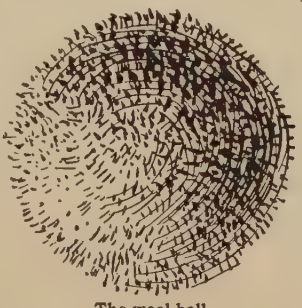
The hole in the middle will soon become full of wool, so that the end will not easily pass through. For the last few turns you may have to thread the wool through the hole with a needle.

When the hole in the middle is quite tight with the wool which has been put through it, take a pair of scissors, and cut the wool all around the edge of the card. Each loop of the wool will have to be cut. Then pull back the pieces, half to one side, and half to the other, so that they are all in a line with the centre. Now tie the wool tightly in the middle with a piece of thin, strong string. Having done that, cut the card with the scissors from the edge down to the middle. It can then be pulled out.

There may be a few ragged edges of the wool to trim off with the scissors to make it look smooth and round, but that is all; the ball is finished and ready for play.

If a ball of different colors is wanted this can easily be done; all you need is to use wools of many colors. First the card is threaded with, say, red wool until it has been covered all the way round. When that one round has been made, cut off the wool which is not wanted, and leave the end level with the edge of the card. Next, blue wool, let us say, may be used for a round, then white, and so on with other colors, until the hole in the card will not let any more pass through.

In this way a very pretty ball can be made. Any sort of wool will do, but the thicker the wool the better and softer the ball.



The wool ball

By sewing odd ends of wool and worsted used for other purposes in the house, a ball can be made without cost. But should wool have to be specially bought for the purpose, quite a big ball can be made for a very few cents. The fact that it is home-made makes the value of the ball seem greater. For games in which a bouncing ball is required, this one is not of much service, but on wet days it is just the thing for the nursery; it will not break windows or ornaments; indiarubber balls do.

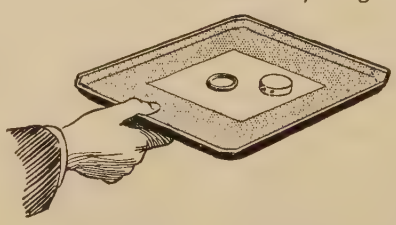
HOW TO MAKE A MAGIC KNOT

THIS is a trick which, once seen, can be performed by anybody. We ask one of our friends to take hold of a handkerchief by two of its opposite corners, and to tie a knot on it without losing hold of the corners. This may seem not very easy—indeed, impossible; but, like many tricks, it is only necessary "to know how" to be able to do it without difficulty. All that is required is that the person taking hold of the ends of the handkerchief should fold his arms before doing so. Then, by simply unfolding the arms, the knot comes on the handkerchief as a matter of course. A piece of string will serve as well as a handkerchief, but should not be less than eighteen inches long. Too short a piece makes the trick much more difficult to perform.

A CLEVER RING AND COIN TRICK

THIS is another trick for which you can manufacture the apparatus for yourself. Some of the tricks we have explained you may possibly have seen performed by other people, but this is quite a new one, and will be found to puzzle even those wise persons who think they know everything.

Three articles are used in the trick—namely, a piece of blotting-paper, a brass curtain-ring about 1½ inches in diameter, and a round cardboard box of such a size as to fit exactly, but not too tightly, over the ring. An ordinary pill-box or the lid of such a box, if of the right size, will answer the purpose nicely. At starting, all these articles should be lying on a small tray—the box on the paper and the ring beside the box—after the manner shown in the picture.



The materials for the ring and coin trick

We will first describe the effect of the trick, and then reveal the secret of how it is done.

We pick up the box, which we explain is intended merely as a cover for the ring, and, handing it to somebody ask him to make sure that there is no hole in it. While he is examining it, we borrow a nickel, and lay this on the paper by the side of the ring.

When the box is returned to us, we say, "Now watch closely. You see I place this cover over the ring, and then both together over the nickel." In doing this we press the sides of the box a little, so as to lift the ring within it. "Is that fairly done? Are you certain that the nickel is under that cover? If not, I will show it you once more."

You do so, again lifting the ring within the cover and showing the nickel. "But I have only to touch it with my finger, and say 'Presto!' and the nickel will melt away." We lift the cover, but this time we do not press the sides, so that the ring is left behind on the paper. The nickel is gone. We show our hands; we show the cover. Both are alike empty.

We continue, "I see that the gentleman who lent me the nickel is getting anxious about his money, so I will reverse the spell, and bring it back again." Once more cover the ring with the box. "This time I touch it with my thumb." We do so, again pronouncing some phrase such as "Presto!" by way of a magic spell. Again we lift cover and ring together; and the coin is seen lying on the table, as at first.

How is it done? The deception lies in the brass ring. To this is glued, on the underside, a circular piece of the same sort of paper as that on which it lies, so that instead of being a mere open ring, as everybody naturally takes it to be, it is like a tiny tambourine, if you can fancy one so small.

When, therefore, the ring, covered by the box, is brought over the coin, and the box again lifted, leaving the ring behind, the coin is hidden, being covered by the paper attached to the ring. When the cover is once more placed over the ring, and the ring lifted within it, the coin is seen again.

The trick is so surprizing that it is sure to be encored; and you agree to do it once more. This time you vary the mode of working a little. Instead of placing ring and cover together over the nickel, you lay the coin inside the ring as it lies on the paper, then cover this with the box, and, lifting both together, show that the coin has again disappeared, being, in fact, picked up by the closed ring. As the cover, on the occasion of the first disappearance, was clearly shown to be empty, nobody is likely to suspect it now; but you must not allow people too much time to think about the matter. Replacing the box on the paper, and lifting it again without the ring, the coin is made to reappear.

Nobody ever suspects any sort of preparation about the ring. A mere ring, as this appears to be, cannot surely conceal anything whatever. At the same time, the young wizard will find it a good plan to have an ordinary ring to correspond, and let this lie on the paper in the first instance.

He may then bring forward ring, box, and paper on the tray for inspection. The tray should be held with thumb above and fingers below, as shown in the picture, the prepared ring being between the fingers and the underside of the tray. In turning round again to place the tray upon the table, he will have ample opportunity, unless he is a very poor conjurer, to exchange the open ring for the prepared one.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF JULY

AS the flowers of various plants fade the seed vessels appear. We must think carefully what this means, so far as the growth of the plant is concerned.

It means that much of the strength of the plant will go towards the forming and ripening of the seeds, and if the seed vessels are allowed to remain the plant will not continue nearly so long to produce fresh flowers as it would if they were promptly removed directly the flowers began to fade. Therefore, all faded flowers should be cut off: we can go round every day with a pair of scissors and a basket, and cut off all the dead flowers.

But there are exceptions to every rule. We grow a few plants for the sake of their brightly colored or beautifully shaped seed vessels. Among these is the winter cherry, a low-growing plant with white flowers that are not nearly so pretty as many others, but when the flowers have disappeared great balloon-like seed vessels gradually appear. At first these are green, but in time they change to a brilliant orange-red, and if they are gathered they can be used in vases in the house all through the winter. They are sometimes called Chinese lanterns. Another plant with very handsome seed vessels is the Crown Imperial, so that these, too, are interesting to leave, at any rate for a time.

It may happen that we have a particularly fine blossom and we desire to save the seed. In that case we should tie a piece of wool round the stem, and very carefully remove all the other flowers from the plant as they fade. Then, when perfectly ripe, and not a day before, we may cut the stem bearing the seed vessel, and, after leaving it in a sunny place for a few days, may carefully shake out the seeds and put them away for use; but they must be perfectly dry and also kept in a dry place until needed.

In a good many cases it is a good plan to sow seed as soon as it is ripe, as it generally grows quicker and more certainly than seed that has been kept; though, on the other hand, there are some seeds that do not grow for a long time.

If there should be a few plants of carnations in the little plot, these will need careful tying. Each flower stem, unless they are very numerous, should have its own support and be carefully secured to it. Two, or even three, ties may be necessary to each stem.

Some carnations have a bad habit of splitting the calyx—the calyx is the green portion that surrounds the colored petals—and it is said that this bad habit may be partially encouraged by neglecting to tie the flowering stem to the support soon enough, as the stem in that case bends over, and the side of the calyx next the ground gets less sun, and is, therefore, less tough and hard, so that when the plump bud expands it splits the calyx on this weaker side. Tiny rubber bands are sometimes slipped round the calyx to prevent splitting.

Watering, weeding, and stirring the surface soil between the plants should all be continued as described in a former chapter, and almost every month roses may have attention.

Besides watering in dry weather, we must always be on the look-out for *suckers*. Where roses are growing on their own roots, having been reared from cuttings, there will be no suckers at all. But many of the rose-trees we buy have not been thus raised; the roots and lower portion of the stem are of wild brier, and on to this a piece of garden rose has been grafted, or budded in, and has grown and made the fine tree as we know it. But any growths that come from the roots or from the stem below the graft will be wild brier. These are the suckers. They should be taken off as far beneath the surface as possible.

A little plot of carnations which need careful tying

How are you to know a sucker from a cultivated rose shoot? Very easily. Pick a few leaves from a wild brier rose growing out in the hedgerows, and bring them home and compare them with the foliage of a cultivated rose, and you will soon learn.

This is the season when budding roses is performed, and it is a most interesting operation. Any clever boy or girl could manage it, especially if he or she has the opportunity to watch the work performed by someone who understands it thoroughly. It may be added that the knife used should be very sharp, and the work is best done during a showery time. The points to learn are these: the right stage to take the bud, how to trim it, how to make the cut in the brier and where, how to insert the bud, and how to tie it carefully.

CASES FOR GLOVES AND HANDKERCHIEFS

MADE OUT OF HALF A YARD OF SOFT WHITE SATIN

HERE is half a yard of soft white satin. Let us see if we cannot make a glove and a handkerchief sachet out of it. As we like to have dainty gloves and handkerchiefs, we also like dainty cases into which to put them.

Now, the satin will be 22 inches wide, so let us cut a strip the full length (½ yard) and 13 inches wide. The piece that remains —9 inches wide and ½ yard long—will just do for the handkerchief sachet.

We must begin by tacking the edges neatly, so that the satin may not fray. Let us decide to have our coloring yellow; it would look pretty if we were to embroider a design of buttercups with leaves on the upper side of the sachet. We could then line them with yellow satin, edge them with yellow cord, and tie them up with yellow ribbon.

Buttercups are very pretty and quite easy to work. First let us draw the design, or, if we cannot draw, we can buy a cheap transfer pattern by the strip.

This we should lay lengthwise on the satin, taking care that the shiny side of the transfer is on the satin, and press it with a moderately hot iron.

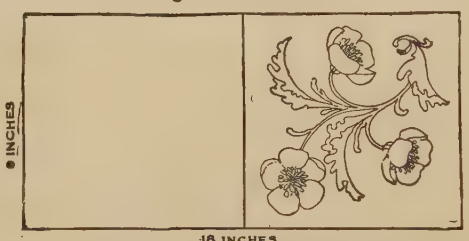
Let us work the buttercups in yellow embroidery floss. They can either be outlined, or, what is much prettier, worked thickly with the silk, and the leaves, of course, will be a soft green, the stems and the veins of the leaves being of a darker shade. If the work is at all puckered, we must iron it carefully on the wrong side, which will smooth away all creases. Having finished our embroidery, we must next get ½ yard of quilted yellow satin which will be enough.

Now we must cut a strip exactly the same size as the satin for our glove sachet and tack it all round. Our next task will be to tack the satin and the lining very carefully together, after which we must sew them very neatly over and over with fine white silk. We must sew very evenly, so that neither the top nor the lining looks puckered.

We shall want a yellow silk cord of medium thickness to match the quilted satin. Four yards at a cost of 10 cents a yard will be sufficient for the two cases, and this must be sewn neatly over and over all round, to hide the stitches that join the satin and lining together. Let us put loops of the cord at the corners—it will look so much more finished than if it is left quite plain.

Pattern of glove sachet

The glove sachet finished



Pattern of the handkerchief sachet

Handkerchief sachet finished

To tie the two cases we shall require 3 yards of yellow ribbon to match the lining and cord. The glove case, being long, will take two sets of ribbon to keep the gloves from falling out. Let us cut each piece of ribbon half a yard long, and sew them on neatly under the cord, about 4 inches from the end.

When this is done, we can lay our gloves on the quilted satin and tie the ribbons together, and we shall have a very pretty addition to the dressing-table.

Now let us turn to our other piece of satin. We shall first tack it all round, and, as it is to be folded to make a square, we must put our buttercups on one half of the satin. We will work it to match the glove sachet, and then cut the lining to fit. We shall then, as before, tack the lining and satin together, and sew it over and over very neatly with white silk. Afterwards we must sew the cord on over and over, and fold the sachet so as to form a square. Now we must sew on one set of ribbons, lay our handkerchiefs on the quilted satin, and tie the ribbons together.

The cost of the material for these two dainty articles will be about a dollar, or leave out the ribbon to tie the cases and fasten them with buttons and loops, which would reduce the cost materially.

By making these two sachets at the same time we are able to make them much cheaper than if we made them separately.

RECIPES FOR CANDY

MOLASSES CANDY

MOLASSES CANDY was made by our grandmothers, but it is just as popular to-day. It is such fun to make, for we can pull the golden brown taffy until it turns into delicious yellow strands. Before we make our candies, it is a good plan to gather together all the materials we need for cooking. The ingredients necessary for this candy are: 2 cups of molasses, 3 tablespoons of butter, 2-3 cup of sugar, and 1 tablespoon vinegar. First melt the butter, and then add the molasses and sugar, stirring until the sugar is dissolved. Boil over a slow fire until it is brittle when tried in cold water. If you use a confectioner's thermometer, it should register about 255°. Just before removing from the fire, add the vinegar. Pour into well buttered pans. When cool enough to handle, you may pull until it turns light colored. Draw into sticks and cut into inch lengths. If you wish Molasses Nut Candy, add one cupful of chopped nut meats and a pinch of salt, just before taking the candy from the stove.

FIVE MINUTE PEPPERMINTS

THERE are so many recipes for Peppermints that it is difficult to choose, but here is a recipe that is reliable. It is a little hard to make these candies for the first time as there are so many things to remember, but when we learn the knack of it, they are very easy. The materials needed are: 1 cup of white sugar, 1-4 cup of boiling water, 1-8 teaspoon of cream of tartar, 6 drops of peppermint, and a bit of coloring paste.

First make the fondant. Put the sugar and water in a pan over the fire, stirring constantly until the sugar is thoroughly dissolved. Remove the spoon and do not stir again while it is boiling. When the syrup first boils, add the cream of tartar. This cuts the grain and helps to keep it creamy. Before it boils carefully wipe the sides of the kettle with a cloth or brush dipped in hot water. Every particle of the sugar must be melted before the syrup begins to boil, and it is important that no sugar grains remain, as it will make the fondant gritty. Cover the pan, as the steam formed will help wash down the sides of the pan.

Let the syrup boil five minutes or until the thermometer reads 240° Fahrenheit. Never stir or shake the syrup while boiling. Remove from the fire, and when cool, beat until creamy. With a medicine dropper, add 6 drops of oil flavoring, and add the coloring matter, which may be purchased in small tubes for a few cents.

Drop in small round-shaped pieces from tip of spoon on waxed paper or marble slab. Do not disturb until the drops are hard and look dull on top. The coloring matter is not necessary. They are just as good white, but more attractive if colored pink or light green.

COCOANUT FUDGE

THIS is a delicious variation of the ever popular fudge. These are the materials necessary: 2 cups (1 pound) of sugar, 1-2 cup of milk or cream, 2 squares of chocolate, 2 tablespoons of butter, 1 teaspoon of vanilla, 1 cup of grated cocoanut. Cook the sugar, chocolate and milk together until it forms a soft ball when tried in cold water, or until the thermometer reads 240°. Remove from the fire, and stir in the butter, cocoanut and vanilla. Beat until it is thick and creamy, and pour into a buttered pan. When it is cool cut into squares.

KARO FUDGE

THE following materials are needed: 1 pound of sugar, which is the same as 2 cups of sugar, 1-3 cup of Karo Corn Syrup, 2-3 cup of milk, 2 tablespoons (1 oz.) of butter, 2 oz. chocolate or 1-2 cup of cocoa, and 1 teaspoon of vanilla.

Put the sugar, corn syrup and milk in a pan and stir until the sugar is dissolved. Then add the finely chopped chocolate, and stir until melted. Cook slowly, stirring it but little while boiling. After 15 minutes see if it has reached the soft ball stage, or if the thermometer reads 240° F. If so, remove the pan from the fire, stir in the butter and vanilla and beat the candy until it begins to cream and to show fine grains around the edges of the pan. Do not beat too long or a gloss will not show on top. Pour into buttered pans and mark in squares.

STUFFED DATES

OPEN a box of dates, wash them in warm water, and remove the stones by cutting along the side with a sharp knife. Put a small piece of walnut in the date, and press the sides together again. Then roll each date in sugar. The dates may also be stuffed with peanut butter, or nuts of different kinds. They are very good when stuffed with preserved ginger and cherries chopped together, figs, or shredded cocoanut finely chopped or salted almonds.

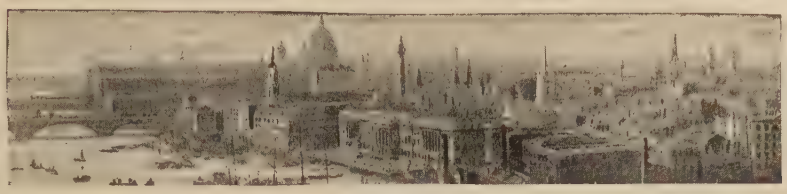
DATES WITH FONDANT

FOR 20 dates we need half a cup of fondant. The fondant is made as follows. Beat the white of an egg until stiff, add 3 tablespoons of water, and gradually 5 cups of confectioner's sugar. When it is almost stiff add the vanilla, and when it rolls away in the form of a ball from the sides of the dish, put it on a board powdered with confectioner's sugar. Knead it as though it were bread dough until it is well mixed. Roll the fondant into sticks about one inch wide, and cut small pieces crosswise. Place a strip in the centre of each date, and sprinkle with powdered sugar.

THE NEXT THINGS TO MAKE AND DO ARE ON PAGE 1297.

A WONDERFUL CHAPEL IN WESTMINSTER ABBEY

This beautiful chapel of Henry VII., built by that King 400 years ago, has been called the finest upright building in England, and somebody has called it "the miracle of the world." It is certain that it is a very dream of splendor, one of the chief glories of Westminster Abbey. Henry VII. lies in a tomb behind the screen, and in this place the kings and queens of England for hundreds of years were buried. No more beautiful building than this remains in England to remind us of the distant past.



GREAT BUILDERS OF LONDON

CONTINUED FROM 1179

THE history of London is different from the history of other great cities of the world. The splendors of Babylon and Nineveh cost little, for there were thousands of slaves to do the work for scarcely more than the cost of their food. Rome was made splendid by emperors who ruled all the known earth. They had countless slaves. They robbed every country to make their own city gorgeous, and with the great wealth of the world they built palaces and halls and theatres and circuses grander than any which have since been made. Florence was built by rulers who loved art and beauty. They lived in an age when the greatest sculptors and painters could be employed for as little cost as an ordinary workman of to-day.

London was a wilderness when the Romans went there. Had they stayed they would have made it a grand city. But they were called home to defend their own capital, and London was burnt again and again by rough men from over the seas. The Saxons and Danes were an uneducated people, who thought of little more than war and the chase, not of building noble cities. The Normans, who conquered England in the eleventh century, were a more educated people, and there are traces of their buildings in London and many parts of England. But their kings were warlike men who never thought of making a beautiful London. When the time came for giving London wealth and power, the people were too busy with trade and travel to think much of making a stately city. There was no call for great architects and builders, so England did not produce them. When such men did arise, the city had been built up higgledy-piggledy, as we say, and it was impossible to put noble buildings in the best positions, or to make broad roads where wretched, crooked little streets of houses already existed. It is wonderful that they got any good buildings at all.

It is impossible to point out all the historic buildings as being the work of this or that man. The beautiful Westminster Abbey was begun on the site of an older church built by Edward the Confessor, who died in 1066. A foreigner, William the Conqueror, was crowned King of England the same year in the cathedral which Edward had built to be a shrine for his own bones. But several kings had to continue the building—Henry III., Richard II., Henry VI., Henry VII., all added important parts; and Sir Christopher Wren built one of the most beautiful additions. Nearly all the kings and queens have been crowned in the Abbey since the time of the Conquest, while there are buried in it thirteen kings of England and many queens.

Many of England's noblest and greatest men — poets, sculptors, statesmen, missionaries, travelers, and others—have been laid there to rest.

Copyright, 1908, by Amalgamated Press, Ltd

THE MEN WHO BUILT THE TOWER

THE Tower of London is the oldest fortress-prison in Europe. Much of the building which we see to-day, standing in gloomy strength overlooking the Thames, has stood there for over 800 years. But under the present tower are the remains of another fortress, which is a thousand years older than this.

London was always the first important place to be seized when enemies invaded the land, and the site of the Tower was seen by all soldiers to be the best for defence. Julius Cæsar is said to have made a fortress there. Certainly the White Tower is built upon Roman foundations, and remains of Roman walls are to be found in other parts of the Tower. London was often burnt and pillaged — it was once so ruined by the Danes that the whole city was desolate, with no one living in it, for thirty years. But when people returned and the wars died down, they always gathered about the Tower as a place of defence and strength. Alfred the Great was the founder of modern London, and he is said to have built another great fortress where the Romans had first built the tower.

THE WEEPING MONK WHO CAME FROM THE EAST TO BUILD THE TOWER

But it was William the Conqueror who began the Tower which is so famous to-day. Although he had conquered England, he felt that he would never be safe until he had built himself a great castle in which he could be surrounded by troops, who would keep him safe in case the Saxons should rise in rebellion against him.

And whom do you think he got to build the Tower for him? It was a monk. His name was Gundulf, and he was born in Normandy in 1024, and was forty-six when William called him to England to begin this great work.

Gundulf was a learned man. He had made a pilgrimage to Jerusalem, and by living in the East had learned many of the secrets by which the Saracens made their buildings beautiful. He had closely studied the simple grandeur of Norman architecture, too, and was able to combine the two styles. He had lived many years in monasteries in Normandy. Life to him was very sad. He did not believe that Christian men ought to be happy. He was always sorrowful, and when at work or at prayer, at meals, or when resting, he was so often given to tears that he was called Gundulf the Weeper.

No matter how he wept, he was a great and grand builder. He founded the Tower. He made a strong fortress for his king, who rewarded him by letting him build Rochester Cathedral and become first Bishop of Rochester.

HOW THE TOWER ROSE IN A STRANGE AND SAVAGE AGE

He built first a great watch-tower, or barbican. From this the surrounding country could be viewed, and the approach of an enemy sighted in time to prepare for defence. That old tower is now the Hall Tower, or, as it is more commonly called, the Jewel Tower. In it the King keeps his crowns and all the State jewels.

Another tower which Weeping Gundulf built was the White Tower, still to be seen in good order to-day. He was one of the greatest of the early builders, and after he died his work was taken up by William Rufus, who taxed the people without mercy for the work. Henry I. did still more, and the people hated him bitterly for his work. They were taxed to pay for it, but they complained that it was being made big and strong, not for the defence of London, but so that the king might have a strong place in which to defy the people when he did wrong.

It was a strange and savage age when the Tower was rising to strength and size. An old writer says that the mortar in which the stones were set was mixed with the blood of beasts. Blood enough of human beings flowed in the Tower to make the blood of beasts unnecessary.

THE TEARS THAT HAVE BEEN SHED IN GUNDULF THE WEEPER'S TOWER

Most of the terrible deeds of which we read in the history of England were done in this grim old Tower. Though kings were born and lived and were married there, it was in the Tower that kings and princes, and queens and princesses, were murdered; that great and good men were imprisoned, tortured, and sometimes killed. Had Gundulf the Weeper known what a place of agony he was creating when he built the Tower, he would have wept still more, and with better reason.

BRITISH MUSEUM, THE LAW COURTS, & THE TOWER

THE BRITISH MUSEUM, THE GREATEST HOME OF PRECIOUS THINGS IN THE WHOLE WORLD

THE LAW COURTS IN THE STRAND, LONDON

THE TOWER OF LONDON, BEGUN 1,000 YEARS AGO AND STILL STANDING BY THE THAMES

It would not be easy to find three buildings more interesting than these. The British Museum is full of wonderful things belonging to every age and to every land; it speaks of the life of all the world. The Law Courts do not interest boys and girls except as a great building, but here are heard the saddest tales of trouble and sin that can be told: this building speaks of the life of to-day. The Tower of London, if it had eyes to see, would have seen some of the bitterest tragedies in history: it speaks of the life of the past.

THE MAN WHO BUILT ST. PAUL'S

IN course of time, when wars with Danes and Normans were forgotten, and Saxons and Danes and Normans became one people, London grew into a big city.

But there was no order or beauty about it. Men built where they wanted or where they could. There were no fine, broad, straight roads. Though the Strand became the chief road from Westminster to the City, it was a dreadful thoroughfare. Nobles and bishops built huge palaces along its sides. It was the most fashionable road in all England. Nine bishops had palaces there at one time, and very fine some of the mansions were.

But the actual road itself was terrible. It was full of pits, in which bad-smelling water collected. Three rapid streams rushed across the Strand to flow down into the Thames; and the Strand, which is now such a busy place for cabs and carriages and 'buses, was crossed by three bridges, so that people might walk over the streams without getting wet. And the people still complained not only of the pits and holes in the Strand, but of the clumps and bushes which grew there.

CHRISTOPHER WREN, THE DEAN'S SON WHO DREAMED OF A NEW ST. PAUL'S

It was at this time that Christopher Wren was born. His birth occurred at East Knoyle, Wiltshire, in October, 1632. He was the son of the Dean of Windsor, and on being sent to Oxford University to study proved himself a wonderful pupil. He won success in mathematics and astronomy and other sciences, and when only twenty-four years old he was made a professor of astronomy. At this time there was already a St. Paul's Cathedral in existence. There has been a church there from far back in Saxon times, but four buildings which, one after another, stood there were destroyed by fire.

Three times the Cathedral was set on fire by lightning. In 1663, the building which then existed was sadly in need of repair, and they called on Christopher Wren to carry out repairs and alterations. Glad he was that they did ask him, for he had longed to do the work. But he was prevented from doing it by a terrible event, the Great Fire of London. This disaster was one of the greatest blessings that have ever come upon London, though at the time it seemed a frightful calamity. Wren saw that London was simply a sink of filth and disease. Everywhere there were little houses of wood, crowded together in narrow streets, into which the sun could not enter, nor sweet air go. There were no drains, and the water was impure. London suffered from everything which makes disease, and disease came everywhere.

THE PLAGUE THAT KILLED 100,000 PEOPLE, AND THE FIRE THAT BURNT 13,000 HOMES

Three times in seventy years the plague swept over the city. The third was the worst time, for then over 100,000 people were killed by it. Still, there seemed no chance of making it better, for the filthy streets and houses remained in the same condition. Wren's work for the Cathedral could not go on while half the city was in mourning for its dead. The great plague year was 1665. On September 2, 1666, the Great Fire of London broke out.

It began in a little wooden house in Pudding Lane, near London Bridge, and spread in all directions. The wooden houses blazed like match-boxes, and the flames leapt from street to street with nothing to stop them. At one time the fire was two miles long and one mile broad. It burnt 13,000 houses, 89 churches, the city gates, the public buildings, the hospitals and libraries. And St. Paul's Cathedral was among the churches destroyed.

WREN'S PLANS FOR BUILDING A NEW AND SPLENDID LONDON

When the terror of plague and fire had died away, the people decided to rebuild their city. Wren drew plans for a splendid city with broad thoroughfares and magnificent docks; but, unfortunately, people could not wait. They built as quickly as they could, without heeding the scheme Wren had designed. They built better houses than before, making them of brick and stone instead of wood; but they followed the old line of the streets, and so to this day there are many crooked ways.

Wren's plans were not altogether wasted, however. Many churches had been burnt down, so he built more than fifty new ones, the finest churches in

ST. PAUL'S, THE NOBLEST DOME IN ENGLAND

Nearly 250 years ago a man walked up Ludgate Hill and saw a heap of ruins at the top. They were the ruins of the old St. Paul's, burned down in the Great Fire of London, in 1666. As the man walked towards the great space the fire had left, he looked up and dreamed of a beautiful dome that would rise up towards the sky. He was Christopher Wren; and to-day his dome rises high above London for all to see. Wren found a stone in the ruins with a word in Latin on it, meaning "I shall rise again," and he made that the first stone of the new St. Paul's. It took him 35 years to build St. Paul's and he was very poorly paid, although his work was so hard that he had to be carried up to the top in a basket several times a week.

The Photographs in these pages are by W. S. Campbell and J. Valentine & Co.

London to-day. He built the Royal Exchange, Temple Bar, the Royal College of Physicians, Greenwich Observatory, Chelsea Hospital, Hampton Court, Marlborough House, and he added to Westminster Abbey. But his most famous feat was the building of the beautiful St. Paul's Cathedral.

THE STONE WHICH WAS TO RISE AGAIN, IN THE NEW ST. PAUL'S

Nearly eight years passed after the fire before the ruins of the old building were cleared away and the new work was begun. When Wren made a start, he picked out a stone from the heap of ruins, and found on it a word in Latin which means "I shall rise again." So he made that the first stone of the new Cathedral. That was on June 21, 1675.

It took him thirty-five years to build the Cathedral; the work was not completed until 1710. All that time, while doing many other things besides, he labored at this—his greatest work. He was poorly paid. receiving only $20 a week—about as much as a good workman now receives—and this sum he did not get without difficulty, so miserably mean and dishonest was King Charles II. A tax was placed on every bit of coal which came up the River Thames to London, solely to pay for the Cathedral, but poor Wren could not always get his wages, though his work was so hard and difficult that he had several times each week to have himself placed in a basket and dragged up to the top of the building to see that all was being done as he wished.

In the end all was splendidly finished, and Wren was himself buried in the noble building which his genius and toil had created. There is a fine tribute to him written in Latin over the entrance to the choir, which says of Wren: "If you would behold his monument, look around you." St. Paul's, one of the grandest buildings in existence, is the monument to that great Englishman who built the finest buildings erected in London since the Great Fire.

THE MAN WHO BUILT THE BRITISH MUSEUM

ONE of the most interesting places in the whole world, the British Museum, was built, in a curious way, by Sir Robert Smirke.

Long before, there had stood where the Museum now is a nobleman's palace, called Montague House. The House and its gardens occupied a space of seven acres, as the Museum does. It was a beautiful and splendid mansion, but as time passed away it needed repairs, which would have cost much money, and its owner, Lord Halifax, was willing to sell it to the Government when they wanted it for a museum.

The reason why the Government wished to set up a museum was this: Sir Hans Sloane, a physician and naturalist, who was born in Ireland in 1660, devoted many years to collecting valuable books and manuscripts and other precious things. He spent $250,000 on this collection. In his will he stated that, if the Government would pay $100,000 to his heirs, they could have his $250,000 collection.

Fortunately, the Government was willing. They agreed to buy that, and, at the same time, to buy the Harleian library of manuscripts, the Cottonian manuscripts, and another library.

Where were they to put all these treasures? They once thought of storing them where the House of Commons now stands, and they thought of other places, too. But no site seemed so favorable as Montague House.

So they passed an Act of Parliament by which a lottery was established to raise $500,000. Lotteries are bad things, but in those days they were not unlawful, so the British Museum was founded from money raised in this way. The sum of money necessary for the collections of books, manuscripts, pictures, and other things was paid; the sum of $50,000 was paid to Lord Halifax for Montague House, and a further $65,000 was to be paid for repairs.

SIR ROBERT SMIRKE, A BUILDER OF CASTLES AND THEATRES AND MUSEUMS

It was in old Montague House that the British Museum was first opened, on January 15, 1759. The building was not suitable, but it was not until 1823 that the present fine edifice was begun. This was the work of Sir Robert Smirke, a great architect, who was born in London on October 1, 1781. He had learned all that he could of the beauties of the buildings of Italy and Greece. He was only twenty-six when appointed

THE CHURCH SPIRES OF SIR CHRISTOPHER WREN

CHURCH OF ST. DUNSTAN'S-IN-THE-EAST

ST. MAGNUS CHURCH LONDON BRIDGE

ST. BRIDE'S CHURCH, FLEET STREET

ST. MARY-LE-BOW CHURCH CHEAPSIDE

ST. JAMES'S CHURCH, GARLICKHITHE

CHRIST CHURCH, NEWGATE STREET

By these beautiful church spires a man who lived 250 years ago has stamped his mind upon London to-day. These spires are part of the beautiful city that Christopher Wren dreamed of building after the Great Fire of London, in 1666, which swept away 13,000 houses, 89 churches, and many miles of streets. Wren, unfortunately, did not have his way, but he built many churches which still stand, and these are some of the spires which still remain to give us some idea of what a beautiful place he might have made London.

to be architect to the Board of Trade, and in that year he began the Mint, on Tower Hill. He built beautiful castles and theatres and other buildings, but he built nothing else so famous as the Museum.

THE WONDERFUL HOME OF THE WONDERS OF AGES AGO

He was one of the men who could do more than one thing at once. In the same year that he began the building of the Museum, he began also the General Post Office, the famous St. Martin's-le-Grand. To make room for this building he had to pull down 131 old houses, in which nearly 1000 people lived. When finished, it was the biggest post-office in the world, but since then it has been greatly extended.

For the Museum, Smirke had a curious task. The old Museum was already there, and this was not to be closed. So Montague House had to be pulled down little by little, and the new building erected in its place. People read and studied day by day at the Museum while one building was being slowly torn down and another slowly put up. It was wonderful work. The grandeur of the style made it necessary to employ bigger stones for the work than had ever been put into a building since the days of the great builders of the Roman Empire. The front of the Museum is made up of 800 solid pieces of stone weighing from five to nine tons each. Sir Robert Smirke labored at his task until 1846, when the work was taken up and finished by his brother, Sydney Smirke, another gifted architect. The building cost about $4,000,000, which is $250,000 more than the cost of St. Paul's Cathedral.

It is a noble building, and contains the most wonderful collections in the world. Books, papers, magazines of all sorts are there. A copy of THE BOOK OF KNOWLEDGE is kept there for you to see again when you are men and women. Manuscripts and wonderful coins, statues, and bronzes from all parts of the world; mummies of people who lived thousands of years before Christ was born; toys which children had when Jacob was a boy; the cats with which Egyptian children played; the very grain that the Egyptians grew—all these, and thousands of other wonders of long ages ago, are in this great building which Sir Robert Smirke put up.

THE MAN WHO BUILT THE HOUSES OF PARLIAMENT

ONE of the strangest things about the House of Commons is that, though men are elected to attend Parliament regularly, there is not room for them to do so.

That is not the fault of Sir Charles Barry, the man who built the Houses of Parliament. When he drew his plans, in 1836, the country had not reformed its methods of electing members, and did not send so many men to sit in Parliament, so that the house which he designed was large enough for all.

Barry was born in London on May 23, 1795, not far from the scene of his chief labors. His father was a stationer, who left him two thousand dollars. Instead of spending this on pleasure, young Barry used it to pay his expenses for traveling and studying abroad. Then a gentleman engaged him to go to Egypt to sketch, at a salary of $20 a week.

Thus Barry was able to study all the best architecture in Europe and the wonders of the ancient world before going back to London to start in business as an architect. He began by building small Gothic churches; but you may see some of his best work in the Royal Institution of Fine Arts, Manchester, and the Athenæum, in the same city; in the King Edward VI. Grammar School, Birmingham; in the Halifax Town Hall, and in private mansions and clubs in London and elsewhere.

THE PALACE THAT ROSE BY THE RIVERSIDE IN NINETEEN YEARS

The old Houses of Parliament were burnt down in 1834. Sixteen months later the plans of Barry were accepted for the re-building. The wall along the riverside was begun in 1837, the year that Queen Victoria came to the throne, but it was not until April 27, 1840, that the first stone of the houses themselves was laid. The House of Lords was finished in 1847, but another five years passed before the House of Commons and House of Lords were finished, and opened by the Queen. The building of this huge palace had thus lasted nineteen years, having cost $15,000,000.

The buildings are among the most admired in Europe, and artists from all

TRAFALGAR SQUARE AND WESTMINSTER

TRAFALGAR SQUARE, THE GREAT OPEN SPACE IN THE CENTRE OF LONDON

THE HOUSES OF PARLIAMENT, THE NOBLEST BLOCK OF BUILDINGS IN LONDON OR IN ENGLAND

WESTMINSTER ABBEY, THE LAST RESTING-PLACE OF THE NATION'S GREAT MEN AND WOMEN

It is not easy to realize the majesty of London from any one place, but nowhere can one realize it better than in Trafalgar Square, which is the very heart of 100 square miles of buildings. From here one can walk down Whitehall, in the footsteps of all the great men in English history, to Westminster, where stands the famous Abbey, with its monuments, and the Houses of Parliament, with the great clock-tower.

parts of the world come to paint pictures of them. Barry was a great man himself, and he got great men to help him in his work. This caused it to be said, after his death, that some of the best work was done not by himself, but by those whom he had employed. Fortunately there were men living who had seen him make the drawings which others were said to have done. His fame was therefore made secure.

Sir John Wolfe Barry, who built the famous Tower Bridge, as well as many other great and splendid works, is one of the sons of the man who built the Houses of Parliament.

THE MAKERS OF TRAFALGAR SQUARE

AND OF THE NATIONAL GALLERY

MANY skilful hands helped to make Trafalgar Square. In olden times kings had kept their hawks and horses there. All around were narrow, mean, dirty streets. King William IV. first thought of pulling down all these old slums and of making a fine square to celebrate the victory of Nelson at Trafalgar. Barry designed the square, which is the finest of the sort in Europe.

The idea of erecting a Nelson Column was first mentioned in 1837, but it was not until 1843 that the work was carried out. The column itself was made by William Railton, R.A., who died at Brighton in 1877. He copied the column from a famous temple in Rome, and had it made of hard Devonshire granite.

FOURTEEN AT A DINNER PARTY AT THE TOP OF THE NELSON COLUMN

The column is 145 feet high, and so broad at the top that, before the statue of Nelson was placed there, fourteen people had dinner on it at one time.

The statue of Nelson, on the top of the column, was made by Edward Hodges Bailey, who was born at Bristol in 1788, and died in London in 1867. He never could learn his lessons at school, but was always drawing funny pictures of his school-fellows. He was a clever sculptor, and made many beautiful statues. His figure of Nelson is seventeen feet high—about three times the height of an ordinary man. It weighs nearly eighteen tons. As a work of art, it is not good, but it answers its purpose.

Many years passed by before the four great lions were placed at the foot of the Nelson Column. They were done at last by Sir Edwin Landseer. He promised and promised and promised to get them done, but they were not placed in their positions until 1867—twenty-four years after the column itself was finished.

He was a little lazy over this, perhaps, but he was a great artist, and very careful. One day Landseer was sitting dozing in his house just after lunch, when his servant entered the room and asked:

"Did you order a lion, sir?"

"A lion?" said Landseer.

"Yes, sir. There's a lion at the door in a hansom cab," answered the servant.

There at the door, in a hansom cab, the lion truly was. But it was dead. It was a fine beast, which had died of old age at the Zoo, and they had sent it to the great painter of animals to study. He had it carried into his studio, and worked away for thirty-six hours until he had painted a noble picture of it. The study of that lion helped him, no doubt, in modeling the famous lions which ornament the Nelson Column.

PULLING DOWN THE KING'S STABLES TO MAKE ROOM FOR THE NATION'S PICTURES

While other work was going on in Trafalgar Square, the Government received gifts of fine pictures, so they decided to pull down what had been the old Royal stables, on the north side of the square, and to build in its place the National Gallery, begun in 1832.

The man chosen for the work was William Wilkins, R.A. He was much hampered by the conditions. First of all, he had to carry a portico from old Carlton House, where George IV. had lived, and make that part of his building. Then he had to leave open a roadway through the building which people had had when the stables were there. He had to be careful not to hide St. Martin's Church, and, finally, he was not to spend more than $350,000, a sum the nation has since paid for one picture.

Altogether, considering how difficult were the conditions, he did very well. Wilkins was a clever architect, who built colleges and castles, and many other good buildings in London.

THE NEXT STORIES OF MEN AND WOMEN BEGIN ON PAGE 1321.

WHAT THIS STORY TELLS US

THE sand in which you play on the seashore and the tumbler from which we drink when thirsty seem very much unlike; and yet the tumbler was made from sand. The same is true of the beautiful colored beads you wear, of the bulbs in the electric lamp, and of hundreds of other things. Below you are told something about the history of glass, and will find that glass has been known for thousands of years. How glass is made is described and some of the simpler methods of making it are also shown. Glass is so common that we do not stop to think about it at all. Like so many other things which we see every day, we take it as a matter of course, and do not realize how marvelous some of the commonest things really are. This story will help to show you.

HOW GLASS IS MADE

CONTINUED FROM 1143

HAVE you ever thought of a world without glass? It is so common and much of it is so cheap that we seldom stop to think how much we depend upon it. We can hardly think of a house without windows, or without dozens of glass things in daily use. We could perhaps get along without glassware on our tables, but for many uses there is no substitute. Electric lighting depends upon the glass bulbs, and a kerosene lamp will not give much light without a chimney. The ancients used polished sheets of metal for mirrors but they were both expensive and heavy, and did not serve the purpose so well as the glass we now use.

Think also of the way in which our modern science depends upon glass. Without it there would be no science of astronomy, and chemistry, medicine, and the other sciences of living things would be much hindered. Without the telescope we could know little of the universe, and glass is necessary in the study of chemistry. Without the microscope we should be ignorant of many facts upon which both our knowledge and our well-being depend, and think, too, of a world without photographs.

Many of these uses of glass are new, but the world has known of glass for many thousand years. It is generally believed that the Egyptians were the first to make the substance, but some believe that it was first used in Syria. Glass vessels many thousands of years old have been discovered in both countries. Beautiful bowls were made in Phoenicia, in Persia, in China and India before they were known to Western Europe. The Greeks were not great glassmakers, but there is much wonderful Roman glass. In Rome it was even used for windows in a few houses, and Italy has been famous for its wonderful objects of glass from very early times. Venetian glass is known everywhere. Constantinople is another city famous for its skilful workers in ornamental glass. Some people believe that some of the ancients knew how to make malleable glass, that is, glass which would bend like metal when dropped rather than shatter into bits.

From the East glassmakers introduced their art into Western Europe, and it soon became widespread. Kings gave special privileges to the glassworkers, who gave themselves great airs, and the wealthy valued some of the things they made more highly than gold or silver. Some of the colored glass made for the windows of the great churches and cathedrals is finer than that made to-day. But, in the Middle Ages, glass was so expensive that the common people could not have vessels of glass, and

Copyright, 1918, by M. Perry Mills.

never even thought of having glass windows. Glass has only become cheap enough for common use within the last hundred years or so. Light was admitted into houses through holes in the walls or in the roof. In stormy weather these openings were often closed by heavy shutters and then the house was dark. Sometimes oiled paper or thin cloth was stretched over the openings. These let some light in, but one could not see through them. Not very long ago the fact that a man had glass windows in his house was supposed to show him to be a man of wealth, and he was taxed accordingly on the number of these windows. As a result many houses were dark.

Among the earliest settlers of Jamestown, Virginia, were some glassworkers, and in 1639 glass was made in Massachusetts. Before the Revolution several other factories were set up in different colonies, and now there are several hundred in different parts of the country. Though there are so many, much glass is still imported from Europe. We have not yet succeeded in making some things as well as they do them abroad.

WHAT IS GLASS AND HOW IS IT MADE?

Glass is a compound of several substances, but the chief is silica. Now silica is the largest and most important part of quartz, and therefore of sand. So we see that the principal source from which glass comes is sand. Some of this sand is gotten by crushing quartz or sandstone, some is obtained from the seashore, from the beds of streams, and sometimes it is taken from the land. Nearly all of it has some impurities, and some sand cannot be used at all because of the presence of large quantities of iron or other minerals, which would color the glass. You have seen cheap window glass or tumblers which had a greenish tinge. This is due to the presence of iron in the glass. Other substances give different colors. Sometimes another ingredient can be added which will combine with the impurity in such a way that the color is destroyed.

Sand alone, however, will not make clear glass. Some other things must be added. The most important are different forms of soda, lime, lead and potash. The purpose for which the glass is to be used decides which of these and how much is to be mixed with the sand. Small quantities of other things may also be added to make particular kinds of glass.

In ordinary glass making the sand, soda, and lime are thoroughly mixed and shoveled into a pot or tank in an intensely hot furnace, together with pieces of broken glass, and lumps of "cullet," which is simply glass which cooled before it was used, and became solid in the furnace. This is broken up and melted again. After several hours these materials fuse together. The mixture is not liquid like water, but it is more like tar or very thick molasses. When colored glass is desired the coloring matter is usually added after the materials have melted.

THE GLASSBLOWER AND HIS WORK

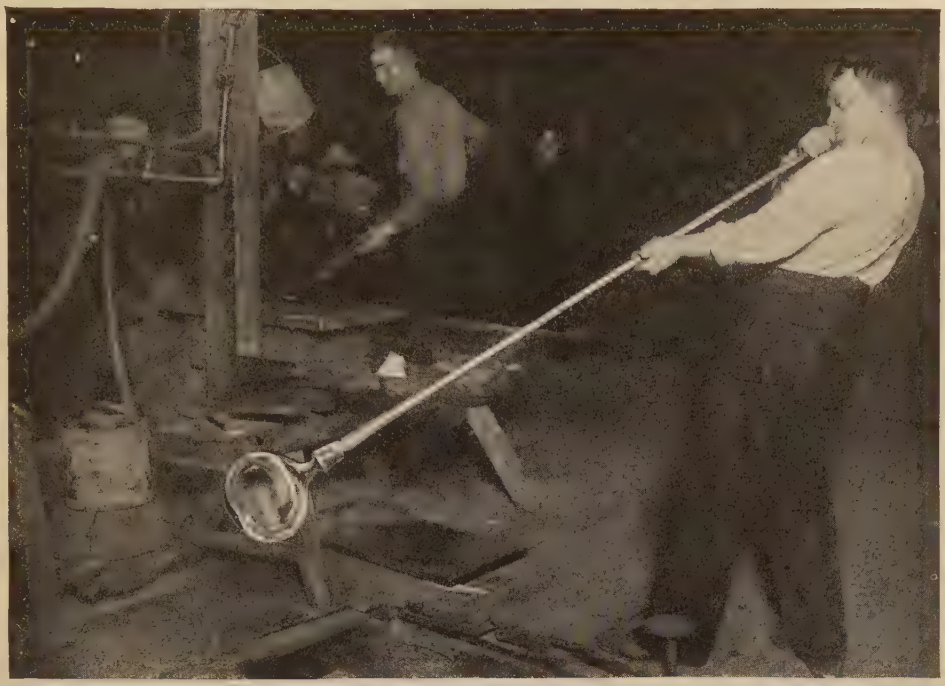
There are several ways of dealing with molten glass. The picturesque glassblower takes a long tube, sticks it into the pot and collects a lump on the end. Then he blows through the tube and the lump at the end swells out into a globe. By swinging the tube, and by rolling the globe on a block while his assistant shapes the bottom, he can make it take various shapes. Fishbowls, wine glasses and the like are made in this way now. A wineglass is usually made in three pieces which are stuck together before the glass hardens. The skill of these men is wonderful, and they can make the soft glass take almost any shape. Formerly most window glass was made by drawing out the globe into a long cylinder, which was then divided, flattened and cut into proper sizes. Now most window glass is made by machine.

Bottles may be made by inserting the globe on the end of the tube into a mold. The breath of the blower makes the soft glass take the shape of the mold. Machines, however, do this work much more rapidly, and now few bottles are made by the old process. Cheap table glassware is made by taking a lump of soft glass and pressing it into shape as if it were made of putty.

THE GLITTERING CUT GLASS

The beautiful cut glass you see is first blown thick. Then on grindstones of different sizes the grooves are cut according to a pattern which has been decided upon, after which the articles are

MAKING GLOBES FOR GOLDFISH



These pictures show how the globes in which goldfish often live are made. A workman sticks a long tube into a pot of molten glass and brings out a lump. He shapes it slightly and hands it to the blower who forces his breath through the tube, swinging and rolling the globe. If it grows too cold he reheats it.

When the globe has reached the proper size another rod is dipped in melted glass and stuck to the bottom. The globe is then cut from the blowing tube and you see the second man shaping the mouth of the globe before it has entirely hardened. The rod is then broken away from the bottom and the rough place ground smooth.

Pictures from Brown Bros.

MAKING WINDOW GLASS AND DEMIJOHNS

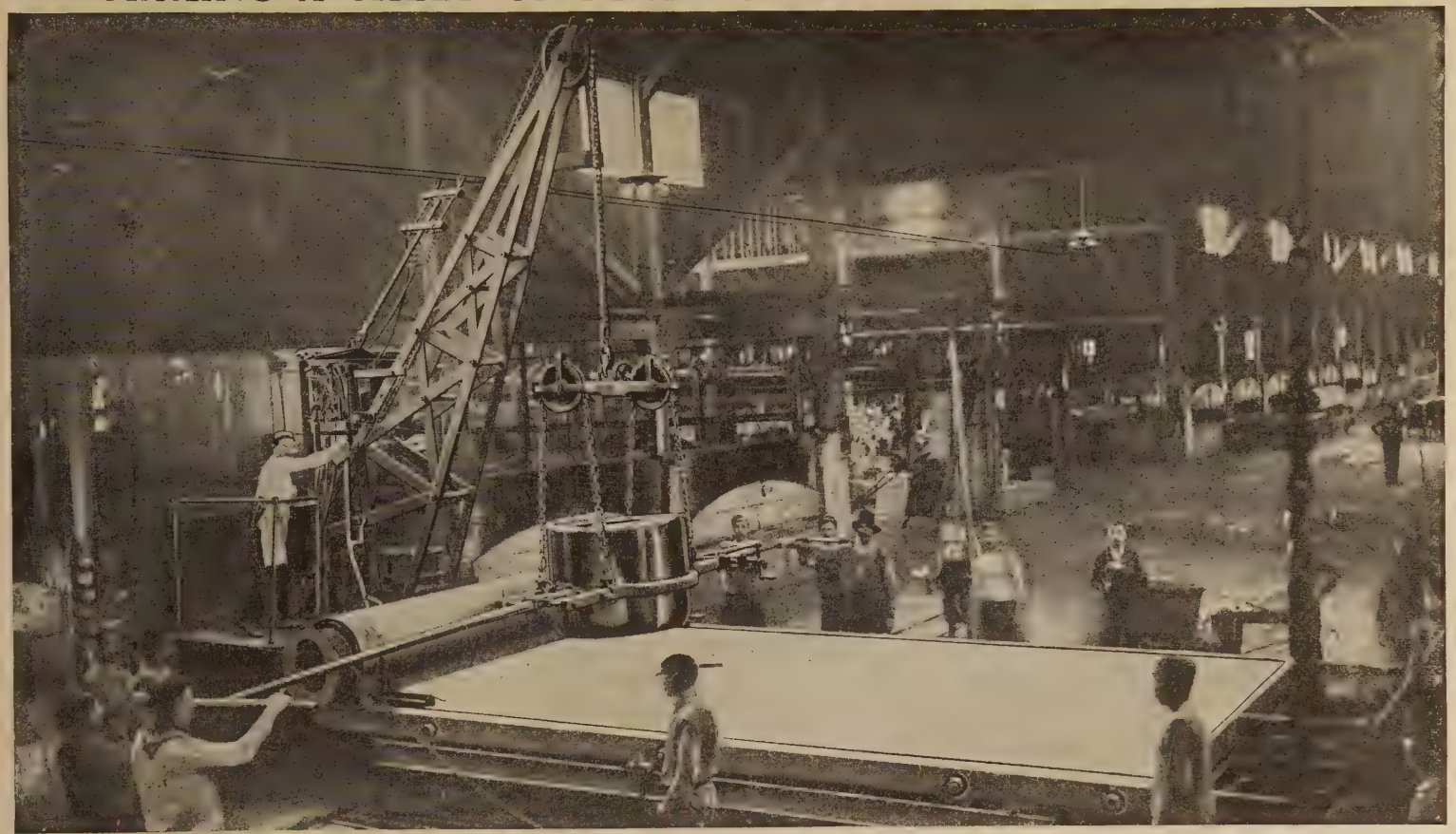
Picture from Brown Bros.

Though much window glass is made by the help of machinery, a great deal is made by this process. A man gathers a lump of glass, just as was shown on the previous page, and shapes it. The next man takes the globe and with wonderful skill blowing, swinging and reheating, makes it take the form of a cylinder. The ends are then cut off and the cylinder is split down the middle. It is then flattened out and sent again through a hot chamber. When it comes out it lies flat and is then cut into the exact size desired.

Picture from Underwood & Underwood, N. Y.

In the foreground the two men are blowing and shaping a great demijohn which will hold several gallons when completed. The weight of the glass is so great that one man cannot handle it alone. One blows while the other shapes it on the slab. In the background a man is shaping a great globe.

MAKING A SHEET OF PLATE GLASS FOR A SHOP WINDOW



Here we see the process of making the enormous plate glass shop windows we see in the cities. The swinging crane brings the pot of molten glass above the heavy iron table. The glass is poured upon the table, and the roller you see at the end is run back and forth until the table is covered, and the sheet of glass is smooth. Afterward the glass is polished and trimmed. This sheet is twelve and a half feet wide and twenty-one feet long. Perhaps some of you have looked through this very sheet. Picture from Underwood & Underwood, N. Y.

MIRRORS IN WHICH TO SEE OURSELVES

Formerly plates of metal were used as mirrors. When glass was first used it was given a coat of mercury and tin, but the process was slow and expensive. Now pieces of plate glass are laid on a warm table and a solution of nitrate of silver is carefully poured over them and spread evenly over the whole surface of the glass. The silver reflects more of the rays of light than the mixture formerly used.

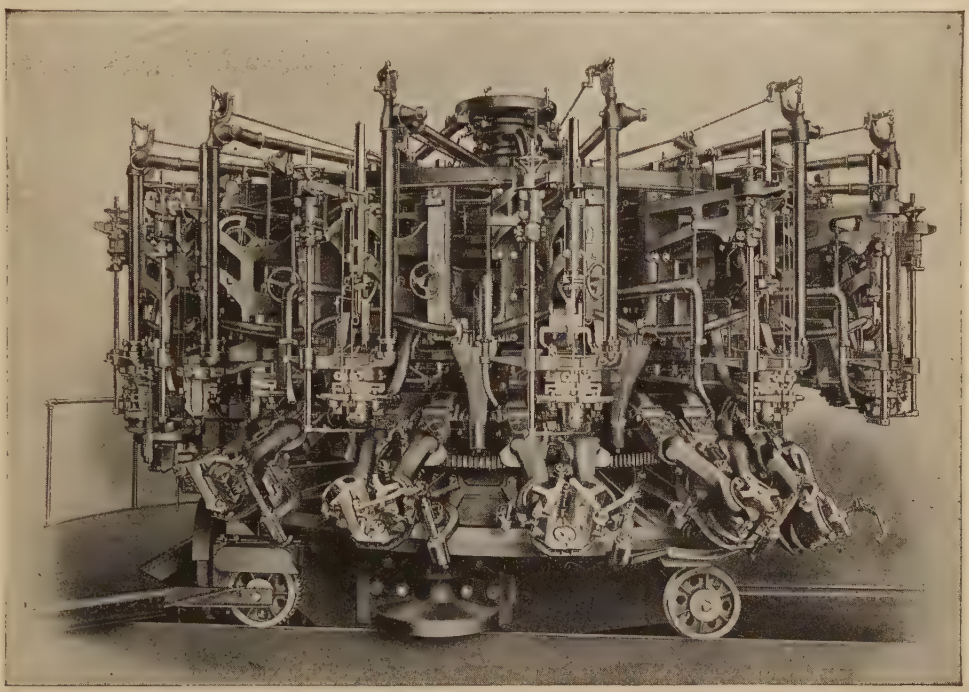
Often a second coat of silver is applied. After it has thoroughly dried a coat of varnish and then one of black paint are spread over the glass. The large plates are then ready to be framed or to be cut into smaller pieces. Only the very finest glass will make a good mirror, and all work must be carefully done. Pictures from Brown Bros.

polished. Skilful workmen are needed for these processes also, and the risk of breakage is great. Much pressed glass is made to imitate cut glass, but does not have the sparkle and glitter of the real article.

There is much more to say about glass. We might speak of wire glass which is useful to prevent the spread of fire. Wire netting is imbedded in the panes, or is placed between two sheets while they are still hot, and then they are pressed together. The netting keeps the panes from falling out when struck, or when the heat becomes very great. The great, heavy plate glass of the shop windows is made by pouring molten glass upon a firm metal bed. Over this heavy rollers run until the sheet is of the same thickness in every part. It is then polished and the edges trimmed. Glass for the tops of tables or desks is made in this way. Glass is also used for pavements over cellars underneath the sidewalk. Glass may be spun into a sort of cloth, and tiny threads of glass make a substance known as mineral wool, which is used to make walls rat-proof and fireproof. There is a special kind of glass which looks very much like porcelain, and is so tough that it will stand hard shocks without breaking.

The story of the manufacture of glass for special uses such as the lenses for telescopes, opera glasses, and cameras is long and interesting. This glass must be made with great care, for the slightest irregularity of any sort would spoil the whole piece. When perfect pieces have been made lenses must be ground very carefully. A lens for a great telescope costs many thousands of dollars.

The beauties of glass are too numerous to mention. You have seen wonderful vases, plates and cups in the shops with their marvelous colors. Some of these colors are obtained by mixing the coloring in the pot, some by mixing two or more different batches of glass, some by applying coloring matter or enamel after the vase has been shaped and then applying heat. To tell of all these would require a book, instead of a few lines.



Picture by courtesy of the Owens Bottle-Machine Company.

This is the latest type of bottle-blowing machine. The machine revolves and each of the fifteen arms in turn sucks up from a furnace not shown in the picture, the proper quantity of molten glass to make a bottle of the size desired. By means of compressed air the glass is then forced against the sides of the molds and a perfect bottle is made without the help of human hands. This machine can make over 40,000 bottles in twenty-four hours. Even more of certain sizes have been made, and we may see even greater machines.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1339.

THE MEN WHO MADE CANADA A NATION

In October, 1864, a number of the leading men of the eastern provinces of British North America met in Quebec to discuss the question of union. At this meeting the "Seventy-two Resolutions" were passed. New Brunswick, Nova Scotia, Ontario and Quebec adopted the resolutions, which were taken by delegates from the four provinces to London, where a final conference was held. With few amendments, the resolutions were drafted into a bill, which was passed as the British North America Act, the Constitution of Canada. The man standing against the centre window is Sir John Macdonald, and seated in the foreground is his great opponent, George Brown.

Photograph by Pringle & Booth, Toronto.

BEAUTIFUL HAMILTON ON LAKE ONTARIO

CANADA AS A NATION

CONTINUED FROM 759

THE insurrection in 1837 and 1838 was not a rebellion against the British government. It was a civil war in Upper Canada between parties and in Lower Canada between races. The two movements were perfectly distinct in their origin and in their course, though there was sympathy between them. The rebellion was never serious as regards numbers, influence or possible result. It showed the sincerity of popular loyalty beneath all the foam of foolish public speeches. The loyal reformers were separated from the fiery advocates of independence.

LORD DURHAM, THE PACIFIER, AND HIS WORK

As a result of the rebellion, the constitution of Lower Canada was suspended. The French Canadians were silent while the English reformers were scattered and broken in influence. In Upper Canada, the loyalist Tories won at the election. This situation could not last long, but it required a man of great ability to reorganize affairs and settle the troubles. Such a man was found in Lord Durham, who was sent out. He came with full power to settle the country, to bring peace and to prevent further trouble, and proved to be the right man in the right place.

He first reorganized temporarily the government of Lower Canada. A governing council from his own staff was appointed, consisting of five judges and two leading officials. He himself traveled over both provinces, investigating every possible grievance, and called a meeting of the lieutenant-governors and the leading men of the different provinces at Quebec to discuss the question of a union of all the British colonies in North America. The time was not yet ripe for such a project and Lord Durham in his report merely mentions the idea as a policy which would insure peace and progress without recommending its adoption at that time.

The governor's great trouble was with the prisoners who crowded the jails of the country, and with the rebel leaders, who had escaped and might return at any moment to renew disturbance and promote discontent. A general pardon, he did not consider wise, but the less important prisoners were freed upon promise of good behavior. With the ringleaders, who had fled, he could do nothing except to prevent their return, which he did by declaring that if they were found within the borders of the country they would be executed. Of the chief culprits, among whom was Dr. Wolfred Nelson, he banished eight to Bermuda, on pain of execution for high treason if they should return. This last action

Copyright, 1913. 1918, by M. Perry Mills.

was made the occasion for a violent attack by the opponents of the home government in England, which weakened and declared that Lord Durham had gone beyond his powers, and that the decree should not be allowed. Durham at once resigned, declaring that he had not been supported in his necessary punishment of notorious rebels, and returned home without waiting for a recall, or for the acceptance of his resignation in London.

The Durham Report and What Came of It

On his way home, Lord Durham, with the assistance of his secretary, Charles Buller, finished a report on the condition of British North America, including Nova Scotia and New Brunswick. In this report, Lord Durham set out a long list of the grievances of which the provinces had cause to complain, and which ought to be removed. He declared that most of the trouble in Lower Canada came from conflict between the two races, French and English, while in Upper Canada, it grew out of politics. To remedy the state of affairs which had led to the rebellions, he thought Upper and Lower Canada should again be united, and that they should be given self-government. He said that grants of money should be made only by the legislature, that the towns and townships should be allowed to tax themselves for local needs and improvements, and he proposed that a railway should be built to bring Nova Scotia and New Brunswick into closer union with the other provinces. He also advised that improvements should be made in the canals.

Early in 1839 the report was laid before the British Parliament, and a bill to unite Upper and Lower Canada was introduced. It was not passed that year, however, because it was necessary to obtain the consent of the provinces. To do this, Mr. Poulett Thompson, afterwards Lord Sydenham, a shrewd and careful administrator, was sent out as governor. He arrived at Montreal in November and had little trouble in obtaining the consent of the Lower Province, and in December, he succeeded in passing a favorable bill through the legislature of Upper Canada. Then Lord John Russell, the colonial secretary, again introduced his bill, it passed the British Parliament, and on the 10th of February, 1840, the two provinces were reunited.

Upper and Lower Canada are Again United

Under the act, the Province of Canada, for by this name the united provinces were to be known, was provided with a legislative council and an assembly. The legislative council was to consist of not less than twenty members, who were to be appointed for life by the governor as representative of the king. The assembly was to consist of eighty-four members, one half to be elected from each of the two old divisions, Upper and Lower Canada. The number of representatives in the assembly could be changed only by a majority of two-thirds in each branch of the legislature. The assembly was to continue for four years after each election, unless sooner dissolved by the governor. Any provincial act might be disallowed by the British Parliament at any time within two years after it was received by the colonial secretary in London. All written proceedings of the legislature were to be only in the English language. The capital of Canada was to be fixed from time to time by the governor.

Kingston, the First Capital of Canada

The first general election was held in March (1841) and the first parliament met in June at Kingston, the new capital of Canada. For the legislative council, Lord Sydenham chose twenty-four men from different parts of the united province. This new parliament entered upon its work with much energy.

Particular attention was paid to public works. The Welland Canal became the property of the province. Provision was made for the building of new canals on the St. Lawrence River. A municipal act was passed, which gave a form of self-government to the towns and townships. Large sums were voted for road improvement and the old corduroy roads rapidly gave place to gravel roadbeds.

A few days before the session of 1841 closed, Lord Sydenham was thrown from his horse, and died as a result of the accident.

The First Party Ministry

His first successor in office was Sir Charles Bagot, who took a very important step for the future of the colony.

BEAUTIFUL QUEBEC ON THE HEIGHT

Here are two parts of Quebec, one known as the Lower Town and the other as the Upper. Here is a view down Champlain Street in the picturesque Lower Town. The Lower Town was the site of Champlain's fort, from which the city sprang. The heights behind it kept the Lower Town from growing and so the Upper Town was built.

Here we see another view of the contrast between the old and the new. On the height to the left is the great Chateau Frontenac Hotel with Dufferin Terrace in front. Below is the quaint old Lower Town. Photographs copyright, by H. C. White Co.

He appointed all the ministers from the party in power, and in order to do this, he admitted French-Canadians to the Executive Council or Cabinet. It was the first distinctly party ministry in the British colonies, and Bagot was severely criticized by the colonial office in England. In consequence he asked to be recalled and his request was granted, but he died at Kingston in March, 1843.

The Foundation of the Public School System in Canada

Immediately after the union of the provinces, the legislature turned its attention to the important matter of providing schools for the children. In Quebec the church authorities preferred to keep the schools in their own hands; but in Ontario a school was built in every township. Grammar schools were provided in the large centres, and model schools were built, so that teachers might be trained. The government gave some of the money for these purposes; the towns and townships taxed themselves for part, and for the rest, the parents had to pay a certain sum for each child. Although as yet parents were not compelled to send their children to school, this was the beginning of the public school system in Canada. In 1843, Dr. Egerton Ryerson, a Methodist clergyman whose name is held in high honor among Canadians, was made the first General Superintendent of Education for Ontario, and devoted a great deal of the rest of his life to increasing the usefulness of the schools.

Responsible Government is Threatened but Triumphs

Sir Charles Bagot's successor was Sir Charles Metcalfe, who proved to be the centre of one of the most stormy periods in Canadian history. During the years which had passed since the union of the provinces, the country had been working toward responsible government, which means that a party can stay in power only so long as it has the support of a majority of the members of the legislature. Sir Charles Metcalfe, who arrived in 1843, could not understand this system and from the first he determined to lead his council instead of being guided by it.

He sought counsel openly of men known to be unfriendly to his ministers, he made appointments to office without regard to the wishes of his ministers, and finally made one appointment in direct opposition to their advice. This was too much, and the ministers resigned. The general election which followed gave the governor a small majority, but during the next two years, a continuous struggle went on between the two political parties. In the fall of 1845, however, Metcalfe resigned on account of ill health, and was succeeded by Earl Cathcart, the commander of the army, who held the position until the end of January, 1847, when Lord Elgin was appointed.

Lord Elgin came to Canada as its governor in 1847. He had married a daughter of Lord Durham and was anxious to see his father-in-law's views carried into practice. Like Lord Durham, this great administrator possessed the ability to grasp at once all the threads of a tangled situation. He could see the real love of their country which the liberals had as well as their love of liberty, and he could also see that the love of power showed by the Tories was not mere desire for office and position, but was in great part desire for power to do what they believed to be best for their country's good.

Lord Elgin was in sympathy with the workings of responsible government. So far as he was concerned, parties, in order to keep in power, had to have the support of the majority of the people. He gave the leaders the fullest freedom of action and aided the successful party in carrying on the government according to the wishes of the majority. The old loyalists claimed this was an abdication of the duties of the governor-general and a sacrifice of one of the remaining shreds of British power over provincial affairs, but to it they had to submit.

Reciprocity with the United States

Meantime the country was growing slowly. Since the American Revolution Canada had been aided by the laws under which Canadian products paid only a small customs duty in England, instead of the high duty charged on merchandise from the United States and other countries. But in 1846 England began to adopt free trade, and Canada was deprived of her former advantages in the English markets. Commercial depression followed. Property in the towns lost half its value, and large numbers of

MONTREAL, THE ISLAND CITY

Montreal, the city of Champlain, yet holds the first rank among Canadian cities. Behind it towers Mount Royal, which is the English form of the word Montreal. Few cities are more beautiful. This view which shows Victoria Bridge in the distance, was taken from the mountain, which has been made into a fine park.

The broad St. Lawrence connects Montreal with the sea. Here are the busy wharves at which steamers from Europe load and unload. The St. Lawrence is here crossed by the great Victoria Bridge a marvel of engineering skill. Except in winter, the largest ocean-going steamships can come to the city.

merchants became bankrupt. A feeling in favor of union with the United States spread among some of the merchants, especially in Montreal. Elgin himself was astonished that the discontent did not produce an outbreak. There was, as he said, but one way of restoring contentment. That was to gain a new market by obtaining favorable trade relations with the United States, and to secure it the governor in company with delegates went to Washington and succeeded in securing a reciprocity treaty (1854). Under it the United States and the British provinces were each to admit the products of the farm, the forest and the sea of the other free of duty. A very large increase in trade soon followed between the two countries. The agreement lasted for about ten years and came to an end by the wish of the United States in 1866, just about the time that the provinces in British North America were preparing to unite.

CONFEDERATION OF THE PROVINCES SUGGESTED

The feeling that the government in Canada was not the best had been growing for some time, and in 1859 the reform party suggested that instead of the existing legislature there should be a federal union between the two parts of the province. Each part should have its own parliament to regulate its local affairs, while a parliament chosen on a basis of population should legislate on all matters of common concern. The reform party of Lower Canada also adopted these principles, but at first little interest was shown. The movement continued to grow, however, and its strength was increased by the disputes between the United States and England during the American Civil War. The English government favored the idea, and Lord Monck, who was appointed governor-general in 1861, used all his influence to advance the plan. Lieutenant-governors were appointed with distinct, though private, instructions along the same lines.

THE FATHERS OF CONFEDERATION AND THE QUEBEC CONFERENCE

In October, 1864, a conference of leading men from Canada, Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland met in Quebec. These men, known in history as the "Fathers of Confederation," met with the object of laying the foundations of a new British Empire. This gathering after a prolonged discussion finally passed the "Seventy-two Resolutions," which practically constituted the British North America Act of 1867.

There was a long struggle before success came, but the Resolutions were adopted in the Canadian Assembly, in 1865, by ninety-one to thirty-three votes, and in the council by eighty-five to forty-five votes. After two general elections in New Brunswick and a change of government they were approved in July, 1866, by good majorities. In Nova Scotia, they were adopted by the legislature without a general election. Prince Edward Island and Newfoundland refused to adopt the terms of confederation.

Late in the same year delegates from Canada, Nova Scotia and New Brunswick went to England and on the 4th of December, 1866, met in London for a final conference before the act of confederation was passed. At this conference, a bill was drafted from the Quebec Resolutions. The bill was presented to the British Parliament, was passed, and on the 29th of March, 1867, received the royal assent, and the British North America Act became law and created the Dominion of Canada. The Act provided that the union should take effect upon a day to be fixed by royal proclamation, and on the 22d of May the proclamation was issued, naming the first of July, 1867, as the birthday of the Dominion of Canada. The United Province of Canada was divided into Quebec and Ontario, and with Nova Scotia and New Brunswick comprised the four original provinces in the Dominion.

THE BRITISH NORTH AMERICA ACT—THE CONSTITUTION OF CANADA

The form of government as constituted by the British North America Act consists of: (1) A Governor-General, appointed for five years, who represents the king. (2) A Cabinet composed of members of the privy council for the Dominion chosen from either of the Houses of Parliament. The chief is the premier, who is usually the leader of the House of Commons as well as the recognized leader of his party. The Cabinet must command the support or confidence of a majority in the House of Commons. (3) A Senate whose members are appointed for life by the governor-general in council (that is, by the Dominion cabinet).

Canadians in the Northwest are fully awake to the necessity for education, and are making provision to give every advantage to their children. Saskatoon in Saskatchewan already has a university and an agricultural college, with good primary schools and a high school to prepare the young people for these higher institutions. This picture shows the Collegiate Institute, or High School.

On the plains of the province of Alberta are many cattle ranges like this. In fact Canada seems to be destined to become one of the great meat-producing countries of the world. The ranges in the United States are being broken up into farms and Canada with her millions of acres of fresh land can support many cattle. Canadians are now, however, more inclined to hold large stock farms than to have great ranges.

It is composed of eighty-nine members, who must hold a certain amount of property, be thirty years of age, and British subjects. (4) A House of Commons composed of members elected for a maximum period of five years by popular vote. There is no property qualification, but members must be British subjects, at least twenty-one years of age, and not disqualified by law. (5) Provincial governments composed of a lieutenant-governor appointed for a term of five years by the Dominion cabinet, a ministry composed of the heads of the various departments, and a legislative assembly elected for four years by the people. In Nova Scotia and Quebec there is also a legislative council, appointed by the provincial ministry.

The first Dominion ministry, with Sir John A. Macdonald as Premier, was composed of the men in each province who had fought for confederation. The election took place during the summer of 1867, and this ministry was sustained by large majorities in Ontario, Quebec and New Brunswick. The first Dominion Parliament met at Ottawa on the 7th of November, 1867, and closed in May, 1868.

THE GREAT WESTERN PLAIN BECOMES PART OF THE DOMINION

This first parliament turned its attention to the extension of the Dominion westward toward the Pacific Ocean. Early in December, 1867, resolutions were adopted in favor of the immediate transfer to Canada of Rupert's Land and the North West Territory, which up to that time had been under the control of the Hudson's Bay Company. Some of the people insisted that the company should first be bought out and its claims settled, so that nothing might remain which might afterwards have to be settled in the courts. The resolutions, however, were agreed to, and an address to the Queen was then adopted, requesting that these territories be joined to the Dominion of Canada by an Imperial Order-in-Council. The Imperial government took the same view of the question as the minority did in Canada. The Hudson's Bay Company must first be bought out. Finally a settlement was made whereby the company was to be paid $1,500,000 in cash, and was to retain the land around the various trading-posts, and two sections in each township,—a total reservation of one-twentieth of the region, in return for the surrender of its trade monopoly and all of its claims to government of the great region which stretches from Ontario to the Rocky Mountains, and from the southern boundary of the Dominion to the Pole.

THE RIEL REBELLION AT THE RED RIVER

In 1869, an act was passed providing for the appointment of a lieutenant-governor, and a small council to administer the affairs of the territory until a more permanent form of government could be arranged. The Honorable William Macdougall was appointed lieutenant-governor, and in the early fall of 1869 started for the West. But on reaching Pembina, he was served by a French half-breed with a notice forbidding his entry into the territory, in which a rebellion had broken out.

There was already a settlement of about ten thousand people on the Red River. They were, for the most part, descendants of Scotch settlers, French trappers and Indians, and were called half-breeds. These people, who were not consulted about the change in their government, were almost all ignorant, and were easily persuaded that they were being robbed of the lands over which they hunted. They determined to rebel against the new authorities, who had made stupid mistakes in dealing with them, and to create a government of their own. A convention was called at Fort Garry, now the city of Winnipeg, and a provisional government was set up with Louis Riel as president. The half-breeds took up arms, and there was some fighting, but the outbreak was soon put down, peace was restored, and Riel became a fugitive. He again headed a rebellion in the West in 1885, and was executed.

MANITOBA, THE FIRST OF THE WESTERN PROVINCES

Even before the rebellion was quelled Manitoba was brought into the Confederation. The Imperial Order-in-Council, which made Rupert's Land and the North West Territory part of the Dominion, was issued on the 23d of June, 1870, and the same day the provisional government accepted the law which made Manitoba a province, the first to be carved out of the great West. The new province was composed of the Red River Settlement, another settlement which had been made

THE STATUE OF MAISONNEUVE, MONTREAL

Paul de Chomedey, Sieur de Maisonneuve, stands in the same relation to Montreal as Champlain to Quebec. In 1642 with a small company of followers he made a settlement which he called Ville-Marie de Montreal. There was no thought of profit but it was to be a city of God upon earth. The settlers and their heroic leader faced all difficulties with enthusiasm but the little settlement was many times threatened with destruction by the Indians as well as by hunger. This spirited statue by the famous Canadian sculptor Louis Philippe Hebert was erected in 1905 in the Place d'Armes.

at Portage la Prairie, and the surrounding regions, and its boundaries have since been much enlarged. Under the Manitoba Act, the government was to consist of a lieutenant-governor, a legislative council and a legislature of twenty-four members, but five years later the legislative council was abolished. The legislature now numbers forty-one members.

British Columbia, the Far Western Province

The next province to be admitted was British Columbia, which ies far off across the Rocky Mountains. British Columbia was a self-governing colony with a governor and a legislative council, and had an exciting history of mining camps which sprang up almost in a night, and faded away as quickly when the gold fever had passed. The great fur company had been working there for years, and originally there had been two colonies, British Columbia on the mainland and Vancouver Island, but at their own request they had been united.

As soon as the Dominion was formed the colony decided to join the Confederation, and its legislature passed the necessary resolutions. But the governor, who objected to the union, refused to assent to them, and it was not until his resignation and the appointment of a new governor that the people were able to carry out their wishes. In 1870, however, they were able to send delegates to the Dominion Parliament at Ottawa; terms were agreed upon, and ratified, and on July 20, 1871, British Columbia became the sixth province in the Dominion.

One of the terms of the union with British Columbia was that the Dominion of Canada should commence a railroad to connect the Pacific coast with the older provinces within two years, and complete the work within ten. In the spring of 1872, a bill was passed, providing for the construction under charter of the Canadian Pacific Railway. A company was duly formed, and to it the contract was let. In the session of 1873, charges of corruption were made against the government It was claimed that the company had bought its charter by paying large sums for the election expenses of the supporters of the bill. The charges were denied but an investigation which followed disclosed such a state of affairs that, in November, Sir John A. Macdonald and his ministry resigned. He was succeeded by the Honorable Alexander Mackenzie, leader of the reform party in the House of Commons.

Prince Edward Island Joins the Confederation

Meantime Prince Edward Island, which had at first refused to join the Confederation, had built a railroad from one end of the island to the other. A large debt was contracted which the island was unable to pay, and in their difficulty the people turned to the Dominion. In 1873 delegates were sent to Ottawa to arrange terms of confederation. An agreement was reached, and on July 1, 1873, another province was added to the Dominion.

Canada for the Canadians

Alexander Mackenzie was premier for five years, but at the next general election he was defeated on a very unimportant question. Commencing with 1873, American goods in great quantities were imported into Canada. The tariff of seventeen and a half per cent. was not sufficient to protect the infant Canadian industries and the people clamored for more protection, but Mackenzie paid no heed to their demands. Macdonald, quick to seize an opportunity, started the cry of "Canada for the Canadians" and a higher protection to the Canadian producer. This policy was everywhere favorably received, and in the general elections of 1878, Sir John returned to power, and at once carried into effect his protective policy by an increase in the tariff. Immediately upon his re-election Sir John again turned his attention to the Canadian Pacific Railway, and this great road was finished in 1885.

The Development of the Great West

After the building of the railroad the vast regions of the West gradually gained in importance. Assiniboia, Saskatchewan, Alberta and Athabasca were, on May 17, 1882, made into districts and united under a lieutenant-governor with his capital at Regina, and with institutions which slowly developed until in 1898 they were self-governing. In 1905 these districts were divided into two equal sections, and, under the names of Saskatchewan and Alberta, became provinces of the Dominion. Meanwhile, in April, 1876, Keewatin had been made a district under the Lieutenant-Governor of

Manitoba, and, on October 2, 1895, the unorganized northern country was formed into the districts of Mackenzie, Ungava, and Franklin, and placed under the control of the Regina government. In 1897, after the discovery of gold, the district of Yukon was created and at first given to the Regina government, but the following year this region was placed under Dominion management.

In 1912 Ungava became part of Quebec, part of Keewatin went to Ontario and part to Manitoba, and the remainder of that district with Mackenzie and Franklin form the North West Territories, and are governed by a commission and a council of four members.

Premiers and Governors of the Dominion since Confederation

Except for the five years during which Alexander Mackenzie was in power Sir John A. Macdonald remained at the head of the government from confederation until his death in 1891. Then Sir John Abbott became premier, but in a short time was succeeded by Sir John Thompson. Upon his death in December, 1894, Sir Mackenzie Bowell took up the reins of government. Early in 1896, Sir Charles Tupper resigned his position as High Commissioner for Canada in England to take the leadership of the Conservative party as premier of the Dominion. In the following June elections the Conservatives were defeated and the Liberal party, under the leadership of Sir Wilfrid Laurier, came into power.

Sir Wilfrid held office until 1911, when his party was defeated on the question of reciprocity with the United States and for other reasons. Robert L. Borden, a member for Halifax, who opposed the Laurier policy, succeeded as premier, and has held office since that time.

There were days when the governor was everything to a North American colony. Governor Simcoe and Sir Isaac Brock were the men who made Ontario, and Lord Elgin meant much to the province of Canada, but since confederation the governor-general has lost much of his power. He is a pacifier and his work is to bind closer the ties between Canada and the Motherland.

The first governor-general was Lord Monck, succeeded in 1868 by Lord Lisgar. Lord Dufferin, Canada's most popular governor, came in 1872. He was one of the greatest diplomats of his day and by his tact and diplomacy did a great deal to save the unity of the Dominion. His frequent trips from province to province did much to bind them closer together. He was succeeded in 1878 by the Queen's son-in-law, the Marquess of Lorne. In 1883, the Marquess of Lansdowne was appointed, and five years later he was followed by Lord Stanley. The Earl of Aberdeen, who had held many important posts, came in 1893, and in 1898 he was succeeded by the Earl of Minto. Lord Grey came in 1904, the Duke of Connaught in 1911, and the Duke of Devonshire in 1916.

Canada and Canadians of To-day

Upon the outbreak of the Great War, Canada flung herself into the fray. Before the end of 1914, a Canadian division was across the sea, to be followed by a second, a third, a fourth, and a Canadian cavalry brigade. Replacements kept all of these near full strength. On many battlefields Canadian soldiers showed themselves second to none, and the people at home supported them magnificently.

Canada is a country of wonderful resources, with an abundance of all kinds of raw materials. Her forest lands cover an area of more than a million square miles and she has millions of acres of rich wheat lands awaiting the plough. The richest silver and nickel mines in the world are found within her boundaries. In mineral wealth generally she ranks with any other country, and her manufactures are rapidly being developed. The population was 7,206,643 in 1911.

Canada is rapidly becoming a great nation. Population has grown more slowly than in the great nation to the south of her, but it does not follow that she will always lag behind. Her people have made for her so honorable a name that men and women eager to call themselves Canadians will come to fill up the great North Western plains.

Canadian scholars are heard with respect whenever learned men gather together. Canadian authors find readers everywhere. Every year more books by authors of Canadian birth or adoption are published, and a national literature is developing. Art and architecture are not neglected, and some of the men who have gained wealth are bringing masterpieces of European art across the ocean.

THE NEXT STORY OF CANADA IS ON PAGE 1451.

HOW THE DAISIES GO TO SLEEP

Flowers, like all living things, must go to sleep sometimes, and most flowers sleep at night. Flowers and plants have a wonderful way of living on the air, which they change into food. All through the day the flowers take in their food from the air, and at night, while sleeping, they give back some that they have taken, so as to keep the air fit for our own use, as explained on pages 1283 and 243. Flowers take most of their food in the day and grow at night while asleep. These pictures show the same daisies awake and asleep.

DO FLOWERS SLEEP AT NIGHT?

CONTINUED FROM 1165

PLANTS do go to sleep at night for several interesting reasons. Animals depend upon plants and trees for their proper air, and plants and trees depend upon animal life for theirs. Plants take in the carbon dioxide from the air, using the carbon and giving out the oxygen, thus forming material for the life of animals. Animals—men and beasts—in return, breathe out carbonic acid gas, and so keep the air fit for the life of plants. We could not live without plants, and plants would die but for us.

But when the sun is shining, or so long as light lasts, the plant is so busy taking in its store of carbon dioxide that it has not time to put forth the oxygen due from it. When the daylight dies away, the plant ceases to take in carbon, and, while sleeping, gives off oxygen. A flower takes its food and becomes heavier during the day. It grows at night, and becomes lighter when it is giving off and not taking in anything.

DO FLOWERS WAKE UP IN THE NIGHT?

Flowers do not wake up in the night as we do if our sleep is disturbed, but we must not suppose that plants sleep only at night. Some sleep during the day and wake up in the evening. Pollen has to be brought to many plants by insects. Some insects sleep by day and work by night. These are they which visit the night flowers, carrying the pollen which they need.

Then there are early risers among the flowers. The crocus, for instance, wakes early and goes to sleep soon after midday. Plants and flowers seem to know as well as the wisest of human beings what best to do. Some are so delicate that they cannot bear the glare of the hot sun, so they go to sleep before the heat becomes too great for them, closing their petals and protecting their sensitive parts. Others cannot bear much moisture or cooling, and they go to sleep and keep snug until all is safe again.

For the most part it is at night that the plants sleep. The flowers close their petals with wonderful neatness; the leaves curl; some stalks hang limp, while the stalks of others, in order to let out the oxygen, have to keep erect, as we do when we wish to breathe deep breaths. We can learn much by watching the daily life of the common wild daisy.

CAN FLOWERS TALK TO EACH OTHER?

No. Flowers are wonderful in many ways, and they can do many things which even men cannot do;

Copyright, 1908, by Amalgamated Press, Ltd.

but they cannot talk to each other, either by words, or by expression, or by any other kind of movement. Only the animal world can do this, because only in the animal world has life developed what is called a nervous system.

No plant has a nervous system, even of the humblest kind, much less anything like a brain. We know that many of the lower animals can, in effect, talk to each other, but all of these have some kind of a nervous system; and if we go down in the scale of the animal world, until we reach those creatures which have no nervous system, we find that they cannot express themselves to each other by any means at all.

So much depends upon the power of talking, without which men and women would not be men and women, that this is perhaps the most important thing that the nervous system makes possible. Of course, when we say "talk," we do not mean only talking with the voice. A dumb person, who can only talk on the fingers, may be far cleverer and wiser than a man who is not dumb, but never says anything worth saying.

WHY CAN WE SEE THROUGH GLASS?

Well, it all depends on the glass. It is very easy, indeed, to make glass that we cannot see through, and it was a very useful discovery when men learned how to make glass which can be seen through. We must not fancy that the Romans, for instance, had glass window-panes. If we compare two kinds of glass, one frosted and one clear, we find that a certain amount of light comes through both kinds. They both let a certain amount of light come through, but in the one case we can see what is on the other side, and in the other case we cannot.

Anything like frosted glass, which lets light through without letting us see what is on the other side, is called *translucent*, which simply means *through-shining*. But anything like a window-pane, which lets us see what is on the other side, is called *transparent*, which means *through-appearing*. When the waves of light pass through a translucent thing, like frosted glass, they are all twisted and broken and mixed. That is why, though we can see some light coming through, we cannot make out things on the other side. But transparent glass lets waves of light come through it almost exactly as they came in, so that sometimes we are not sure whether the window-pane is there or not.

WHY CAN WE SEE THROUGH WATER?

Water is much the same as glass in this respect. If there be no solid specks of anything hanging in the water, and if the water be still, it is very fairly transparent. Neither water nor glass nor anything else, I think, lets through absolutely all the light that comes to it. It keeps back at least a little, just as the air itself does with the light of the sun. But still, if the layer of water is not too thick, we may be able to see a long way through it, which is just another way of saying that the light can come through it a long way.

But when you read the last question, I am sure you understood that a thing is not either quite transparent or only translucent, but that we may have any amount of stages in between. So if we go to an aquarium, and look at the fishes or other animals living in the water, we shall see that in one case water may be very clear and transparent, and in another may be only half transparent. There are really all degrees possible—things quite or almost quite transparent, things not quite so transparent, things translucent but still letting us see in a dim way what is behind, other things which let us see nothing behind them and still let light through, and so on—things which let less and less light through, until at last we have things which are not translucent at all and let through no light. These we call *opaque*. The front part of the eye, considering the kind of stuff of which it must be made to be alive, is the most wonderfully transparent thing.

WHY CAN WE SLEEP MORE QUICKLY IN THE DARK THAN IN THE LIGHT?

Everything in the world lets more or less light through it if it is thin enough. Our eyelids must be thin because we have to hold them up when we see, and if they were thick they would be so heavy that it would be hard work to keep our eyes open. It is hard enough work sometimes to keep our eyes open even as it is, when we are sleepy, and our eyelids are apt to drop. Thus, being so thin, our eyelids are very far from being opaque. If they were as opaque as the black cloths that a

photographer uses, then we should go to sleep quite as easily in the light as in the dark, for directly we shut our eyes we should practically be in the dark. But, in fact, our eyelids let a good deal of light through, as we can tell at once if we turn to the window with our eyes shut; and this light helps to keep our brains awake.

CAN OUR EYES SHUT OUT ALL LIGHT?

No. Do not think, however, that we are entitled to blame our eyes and eyelids, and to say that they are not what they should be. In the first place, we are really meant to sleep when the night comes and there is no light, so that it would not matter that our eyelids were capable of letting through a little light. And, in the second place, our brains have learnt a way of avoiding the light as much as possible. For, whenever we shut our eyes, we roll the eyeball a little upwards. This means that not merely have we let down a curtain, but that, as there is just a tiny chink where the curtain meets the lower eyelid, the part of the eyeball where the light comes through is turned up and away so as not to be opposite that chink. Do you not think this is beautiful?

Look at the window with your eyes shut, and then, instead of merely shutting them, screw them up as tightly as you can. This cuts out rather more light, but by no means all. Keep them screwed, and turn your back on the window, and it gets darker still. This is a little experiment with three stages which we can make in three seconds.

WHAT IS LIGHT?

Men have long known that light is something which moves from place to place. It takes time for light to travel. The question, then, was to find out what was moving. Newton, one of the greatest men who ever lived, thought that light was a movement of tiny specks of something—as if a candle or a star were showering out tiny particles in all directions. He thought that when these struck the eye they caused the feeling of light, just as raindrops on the hand cause the feeling of touch. This belief as to what light is was very long held. Men believed it, not so much because it was proved, as because Newton believed in it. Yet we now know that it is not true. There is a great lesson here. No greater mind than Newton's was ever turned to questions like these, yet even Newton could be wrong, and it was wrong to believe it on his authority alone. The only authority in science is Nature itself, and everything that men say, however great they are, must be tested. We now know that light is a wave motion in something which has never been seen and never will be, though it exists everywhere, and is called the ether.

CAN WE STORE SUNLIGHT?

When light falls on the earth it is usually changed into other things. Its power is never turned into nothing, but it is very often wasted. It is a great pity that we do not try to store sunlight, so that we may use it as we need it. We shall no doubt learn to do this some day. Meanwhile, the green world around us *is* strong sunlight. If anyone said to you that there is stored sunlight in coal, you would wonder what he meant, but it is true. The coal is made from the bodies of plants that lived long ago. They lived by sunlight, and turned its power into the making of their own bodies. That power is still in the coal, as we find when we burn it. The light of the fire is sunlight that has long been stored in the earth. Everyone who plants a tree, then, is storing sunlight. Some day, when everyone becomes sensible, we shall not waste great tracts of land, as we do now, but shall use them for storing sunlight by planting trees upon them. Just now scarcely anyone cares about these things, and I do not like to think what *our* children, when they grow up, will think of us who care so little for their interests. For every tree that is cut down, one should be planted somewhere.

WHY DOES THE FACE CHANGE WHEN WE THINK HARD?

Underneath the skin of the face there is a great number of small but wonderful little muscles. These have various uses, such as to open and shut the mouth, raise the eyebrows, and so on, but they are all governed by a single pair of nerves which come from the brain, and which are called the facial nerves, one for each side of the face. These nerves are closely connected with the brain, and so it is that almost everything which happens in the brain affects them,

and may show its signs in the face by movements of the muscles which these nerves control. It is not only when we think, but also when we feel, that the face changes. This is best shown in children.

But it is possible in some degree for us to control the movements of our faces, so that, for instance, we may look happy when we feel sad. Grown-up people usually learn to control the movements of the face; but this is largely a matter of habit. People's faces do not tell nearly so much in England as, for instance, they do in Italy, where people allow their faces to show what they feel and think, just as a child does. When a person's face expresses his thoughts and feelings, we say that it is "expressive," and it is rather nice to meet someone whose face is not like a mask that cannot move.

HOW DID MEN LEARN TO TALK?

Anything that expresses to someone else what is going on in our minds is, in a way, a sort of talking. We can tell by a baby's face, long before it can talk, something of what it wants and feels. We can also tell by a baby's cry a great deal of what it wants and feels. Now, that cry is made with its voice, just as talking is made, and is really a sort of untaught talking. It is made in the same way, and it serves the same purpose. Different kinds of cries have different meanings. Then, also, we not only move our faces and make sounds with our voices, but we move our hands and arms.

In some parts of the world these movements or gestures have definite meanings, and people can talk to each other in this way without saying a word. This is called "gesture language." Just in the same way, different kinds of sounds—and that is all words are in themselves—can come to have special meanings of their own; and that is what happens when we talk. The simplest words, like "mamma," are those which a baby will make all the world over when it first tries to talk. You only have to breathe out through your mouth and separate your lips twice to say mamma. This is the baby's name for its mother in all languages, or something very like it; and if men forgot how to talk, the new babies would soon make a beginning with "mamma." I think it is beautiful that language began in this way.

WHY ARE THERE SO MANY LANGUAGES?

Very many words really begin in imitation of sounds. You know words like, buzz, whir, pop, and so on. People who study language know that far more words begin in this way than most people think. Apart from that, however, we often have to make words simply by inventing them. The word does not matter as long as everyone is agreed as to what it means. A word is only a name. You would still be you if you had been called Tom instead of Harry, or Monica instead of Marjorie. Shakespeare says in one of his plays:

> What's in a name?
> A rose by any other name would smell as sweet.

So in different parts of the world different names have been invented; but, really, different languages are a thousand times more alike than we think—Latin, Greek, Italian, Spanish, Portuguese, and French are really close relatives, because the different peoples who speak them are in large measure descended from the same people. So, nowadays, we can often learn the history of a nation by its language. English is probably the finest language in the world for all purposes, but it is a very funny mixture. "Mixture," for instance, is Latin, and so are tens of thousands of English words. Many others are a sort of French, and many others Anglo-Saxon, which is very like German. We say *father*, the Germans, *vater*, the Romans said *pater*, the French say *père*, and so on. All these words are really the same.

WHY DO LANGUAGES CHANGE AS TIME PASSES?

Every language changes, whether people like it or not. New words are made, and old ones are forgotten. The English we speak and write is very different from Shakespeare's and Chaucer's. Languages have bad periods and good periods. Everyone agrees that the English into which the Bible was translated was the best English there has ever been. These things are partly matters of fashion. Everyone who writes a language does something to make it better or worse: and everyone who reads bad English and does not mind it is encouraging people to write bad English, and so make the language worse.

ARE NEW WORDS MADE FOR NEW THINGS?

Yes; new words are made for new things; and so it is that language is changed more quickly in countries where people write and read a great deal, and where new things are made and done. Then people always want to save time in speaking and reading and writing, so they get shorter ways of saying things, and the tendency of all words is to get shorter. French shows this very much; for instance, in *père*, the French word for father, they have dropped the *t* of pater altogether. We have done the same with *I*, whilst the Germans still say *Ich*, and the Romans actually took the trouble of saying two syllables, *Ego*. Then the Romans said *est* for *is*, and the Germans still say *ist*. The French keep the letters *est*, but they only pronounce the first of them. The modern Italians have not only stopped pronouncing the *st*, but have stopped writing them, and their word for *is* is simply *e*. But if you spent your whole life collecting cases like this, you would not come to the end.

CAN ANIMALS TALK TO EACH OTHER?

People used to think that only human beings could talk to each other, and there is no doubt at all that no other creatures can talk one thousandth part as well as we do. But no one who knows animals now doubts for a moment that many kinds of animals can talk to each other. Only it is not our kind of talking. Monkeys, for instance, make many kinds of sounds with their mouths which have different meanings; only they do not express ideas or make assertions that the earth is round, but they express their feelings. A baby expresses various feelings with its mouth long before it can talk, and so many animals can express fear, joy, anger, and many other feelings with their voices, and their fellows can understand them. That is talking of a kind.

But though monkeys probably come nearer to us in talking—though still very, very far away—than any other animals, yet many insects, which are very simple and humble creatures compared with monkeys, can talk wonderfully in their own way. I mean especially the social insects, like ants and bees and wasps. If they could not tell each other what they felt and wanted, they could not live together in societies as they do—societies, remember, from which human beings have a lot to learn yet, societies in which very few children die. The insects have long "feelers," with which, as it seems, they can touch each other, and say what they want to do or how they feel. But I could write a book on this, and I must stop.

WHY CAN PARROTS TALK, AND NOT OTHER BIRDS?

It is not quite true that other birds cannot be taught to talk, but it is quite true that some birds will learn and others will not, and you are quite right to ask what makes the difference. I think the way in which the bird hears goes for a good deal. If you do not hear properly, then you cannot imitate the sounds that other people make. That is why many poor deaf children are dumb. It may be that parrots have better ears than many other birds.

I think it is also because these birds have brains which help them to distinguish sounds better. You see, talking is really a matter of the brain, far more than the teeth and tongue and lips. But I do want you to understand what the talking of the parrot really is. It is utterly different from the first talking of a child as it learns, though very likely the child does not talk as distinctly as the parrot does.

But when the child talks it means something, even though, very likely, you cannot make out what it means. I believe that the parrot never means anything because it never understands what the words it hears mean. I am sure that the parrot is just like the wonderful machine called a phonograph. You talk into it and it talks back at you, but it understands nothing. Therefore, the talking of the parrot, though it is clever in a way, is really less clever than the way in which insects tell each other what they want.

WHAT LANGUAGE DID JESUS SPEAK?

There is a great group of languages which are all classed as Semitic or Jewish. Amongst these are some which are named after the old word for Syria —the word Aram. It was one of these Aramaic languages that was spoken by Jesus, for before his time Aramaic had

become the language that was spoken in Palestine. We can learn a lesson here. The Aramaic language itself is not a beautiful one to hear. The words are not beautiful so far as their mere sound is concerned. Nor is this what would be called a highly developed language.

It is far from being so. Indeed, the language which Jesus spoke was humble, and so in keeping with everything else that we know about His life; but in this humble language, with its rather ugly sound, He said the noblest and most beautiful things that have ever been uttered on the earth; and in whatever language they are now spoken, whether ancient Aramaic, or a harsh modern language like German, or a beautiful modern language like Italian, they are no less beautiful, and no more —for more they could not be. It is not the sounds that matter, but what is said by them.

ARE THE STARS REALLY CLOSE TOGETHER?

The stars are so far away that our eyes do not help to tell us their distances. Sometimes we may see a star quite close to the moon, seeming side by side, yet they may be millions of miles away. There are seven stars which seem so close, they are sometimes called the "Seven Sisters", astronomers call them the Pleiades. The Pleiades are really what they look like—a star cluster. Of course, when we say "close together" about stars, we mean one kind of closeness, and when we say "close together" in the atoms of a drop of water, we mean another kind of closeness.

The "Seven Sisters" are doubtless thousands of millions of times farther away from each other than the earth is from the sun, but, as compared with other stars, they are close together. Even on the brightest night many of us are only able to see six of the stars in this cluster, and there is an old Greek story about the seventh being lost—the lost Pleiad. But with the telescope, or, still better, with a telescope that has a photographic plate in it, we discover that the six or seven stars that we can see are really only the brightest stars of a great group which is actually to be numbered by tens of thousands. There is nothing in the whole heavens quite so wonderful as this mighty cluster of stars or suns. In all ages men have wondered at their beauty. Job, for instance, did so, thousands of years ago; look at the 9th and 38th chapters of Job.

WHY IS IT THAT THE SEA NEVER GETS ANY LARGER?

This is a question about which men have always wondered. Thoughtful children and grown-up people will be asking these questions again in a thousand years. Let me tell you how it was asked and answered by the Hebrew preacher long years ago (Ecclesiastes 1. 7): "All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again." So we see that this question is answered in the Bible. What happens is that the power of the sun sucks up some of the water from the sea, and then it is poured back upon the land in the form of rain, and that makes the rivers. Besides this, in many parts of the world the sea *does* get larger, because it wears away the land; but in other parts of the world the land extends and the sea gets smaller.

WHAT MAKES THE SEA SALT?

The sun sucks up the water from the sea, but it sucks up nothing else. The salt of the sea has been brought to it by the rivers. These, as they come down from the land, melt away from the land anything that water can melt, and this they carry into the sea. River water is salt, too, only so very little salt that we notice nothing. Sea water is so much salter chiefly because it contains all the salt that the rivers have been carrying down to it for ages past. One of the commonest kinds of salt in sea water is ordinary salt that we use at table, but there are a great number of other kinds too. We must remember that, though table salt is the only kind of salt we usually think of, yet "salt" is really only a general word for a large number of compounds, like each other to some extent, yet different. It is a mixture of a great number of these that helps to make the sea salt.

IF RIVERS MAKE THE SEA SALT, WHY ARE RIVERS FRESH?

The river is not really fresh, but a little salt, and it is largely because the river is a little salt that the sea is very salt. It is true that river water may taste

fresh to our mouths, but that is because we are not accustomed to the taste of water that *really* contains no salt. If we taste, one after the other, two tumblers, one containing river water and one containing sea water, we should certainly know which was which; but if we took two tumblers, one containing river water and the other containing water which contains no salt, and none of the dissolved gases which help to make salts, then you would find it just as easy to tell which was which as in the first case, because you would taste the salt in the river water.

WHY DOES SALT MAKE US THIRSTY?

The reason why table salt makes us thirsty is that we always require a certain proportion of this table salt in our blood and in every part of our bodies; and this proportion, it is very interesting to know, is just about the same as that in the sea, where we suppose that life began. But we must not have more than this proportion. If, then, you take a great deal of salt, it becomes necessary to get the saltness of your blood down again to just the right amount, and the plain and simple way of doing that, as our body perfectly understands, is to get more water into it; and so the wise body says, "I am thirsty." There are ever so many other examples to show how wise our bodies are in what they ask, provided that we treat them properly and do not try to cheat them. All sorts of strong-flavored things make us thirsty, besides salt, and for a similar reason. It is not good to have these things in the body unless they are sufficiently mixed with water. They would hurt the body, just as strong medicine will hurt your mouth and throat unless you add water to it. Children should not take these strongly flavored things, like mustard and pepper and pickles, and I think that older people are wise if they take very little of such things.

WHY DO THEY SAY 13 IS UNLUCKY?

The first thing to say in answer to this question is that 13 is not unlucky. Whoever says it, speaks nonsense. This is what we call a superstition, meaning something which is believed just because someone else has said so, and because people have no faith in God or in Nature. Many superstitions can be traced to something. Some people say, for instance, that 13 is supposed to be unlucky because that was the number of those who sat down at the Last Supper. Perhaps Friday is thought unlucky for a somewhat similar reason, because Friday was the day of the Crucifixion. Then other things are supposed to be lucky, as, for instance, horse-shoes. Other people think that it means something if we see a black cat; that it is unlucky to look at the new moon through glass, and so on.

Many students have spent much time in tracing these superstitions back to their beginning. Long ages ago, when men were savage, and also to-day amongst the few savage peoples that still remain on the earth, we find an endless number of these superstitions. No one would ever listen to them again who had read a few books about savages, and had learnt how wretched these false beliefs make the lives of savages —how many are killed and tortured and frightened because of some superstition or other. But we have not the excuse that savages have, for we profess to believe in a wise and good God, who sees and orders everything that happens on the earth.

WHAT IS LUCK?

There is such a thing as what we call chance, though this, too, has its laws. It may chance, or happen, that you take the second turning instead of the first, and so meet one who becomes your best friend; or that you forget your purse, and so lose a train which is wrecked. But these things do not make up the most of human life. The really lucky thing is to be wise and healthy, and do your duty. One of the wisest men who ever lived was a lame slave called Epictetus, who said, "The mark of a fool is this: he never expects from himself profit nor harm, but from things outside him."

The man who fails in the world is the man who believes in luck, and is always complaining of his own bad luck. He is right—*if* by bad luck he means that he will not work or will not keep his word, or will not stop drinking. It is ourselves that our fate depends upon, more than anything else. If you are loved and happy when a child, if you are taught the things worth learning, then you are almost certain to be lucky.

If you sit down 12 at table and eat and drink too much, that would be an unlucky meal; if you sit down 13 and eat and drink what you should, that would be a lucky meal. No one who is afraid to sit down 13 at table really believes that there is an All-Wise Father. How could he?

WHY CANNOT WE SLEEP WITH OUR EYES OPEN?

To begin with, one reason why our eyes are shut during sleep is that it needs effort to keep our eyes open. When we get sleepy, we relax that effort, and our eyelids drop of their own weight—"softly as tired eyelids upon tired eyes." So that is one answer to the question. We cannot sleep with our eyes open because we cannot hold our eyelids up when we are asleep, and I think that is probably the answer you wanted. But another question is, Why would it keep a man awake to hold his eyes open in the light? (if you held them open for him in the dark he could sleep with his eyes open, though, if you prevented him from winking, they would get very uncomfortable and dry). The reason why light keeps us awake is that it excites our brains, and when we want to go to sleep, of course, one of the first things we have to do is to shut our brains off from the outside world by darkness and by silence.

So, you see, there are two answers to your question—one is that when we are asleep we cannot hold up our eyelids any more than we could hold both arms up in the air, and the other is that light keeps the brain awake.

DO FISHES SLEEP UNDER WATER?

Every living creature has its time of rest. Even microbes rest, and plants, and certainly fishes. The answer to your question, then, is yes; only there is this to be remembered always. When we see a cat asleep, there is no doubt about it, and the difference between a sleeping and a waking cat is very much the same as the difference between a sleeping and a waking child. But the difference between a sleeping and a waking fish is not quite the same. I dare say the sleep of the fish is just like the sleep of the cat or the sleep of you and me, but the waking of the fish is very different, and is very much nearer its sleep than your waking is to your sleep. What I mean is that the fish has such a poor, feeble glimmer of a mind—fishes are really very stupid—that even when widest awake it is still half asleep, compared with what you and I are when we are awake.

DO FISHES SHUT THEIR EYES?

No; fishes do not shut their eyes, and we have already seen that it is quite possible to sleep without the eyes being shut if it were not for the trouble of keeping our eyelids up. Now, an animal cannot shut its eyes unless it has something to shut them with, and the only things that can shut eyes are eyelids; and all the ordinary common fish do not have any eyelids.

They are not the only animals like this. If you will look at the snakes in a Zoo for a minute or two you will notice that they always seem to have their eyes wide open with a fixed stare, although they may appear to be, and perhaps are, fast asleep. This is because the snakes, like the fishes, have no proper eyelids which they can close. But there can be no doubt that when fishes rest, for instance, at the bottom of a pond or river, they sleep in the usual way, only they sleep with their eyes wide open, simply because they cannot shut them.

WHY ARE SOME FISH CAUGHT IN RIVERS, AND NOT IN THE SEA?

I think you might almost as well ask why is it that buffaloes live in America and lions in Africa, and Highland cattle in Scotland. The whole earth and the whole sea are full of life, but different creatures live in different places. You will not catch any sardines if you fish off the pier on your holidays, and you will not catch any mackerel in a river. Some fishes live in the sea and some live in fresh water; and in the sea there are so-called shore fishes and deep-sea fishes. There are also fishes which are specially fond of the mouths of rivers, where the water is not fresh, but is not so salt as sea water.

Then there are certain fishes—such as the salmon—which begin their lives in rivers, spend the summer in the sea along the coast, and in the autumn travel up the rivers again in a way which can only be described as marvelous. There are many names for salmon at different stages of their lives.

THE NEXT QUESTIONS ARE ON PAGE 1411.

THE POETRY OF COMMON THINGS

CONTINUED FROM P. 1151

THERE is hardly any end to the subjects with which poetry may be concerned, since poetry is as varied and extensive in its range as life itself. It is life in song. We have not, therefore, attempted to go further in these little lessons than to mention the chief departments of poetry, and we have already covered most of the field. References to the work of different poets will be found in the BOOK OF MEN AND WOMEN, where we deal with the writers of the great poems; while all the poets who are not important enough to come under that description, but have written verses worthy of being included in the BOOK OF POETRY, are noticed as their poems appear.

What remains for us to remark is the fact that great events are not always needed to furnish the poet with a theme for his muse. And here we may mention that the "poet's muse" is an expression derived from ancient times, when spirits or goddesses were supposed to watch over and inspire writers. These goddesses were called "the muses," and the ancient poets always began their poems by calling upon the Muse of Poetry to inspire them. Homer begins the "Iliad" thus:

Achilles' wrath, to Greece the direful spring
Of woes unnumbered, heavenly goddess, sing!

Assuredly the poet's muse does not depend upon the stirring times of war for inspiration, and that for the reason so well expressed by Milton in the famous lines:

Peace hath her victories
No less renowned than war.

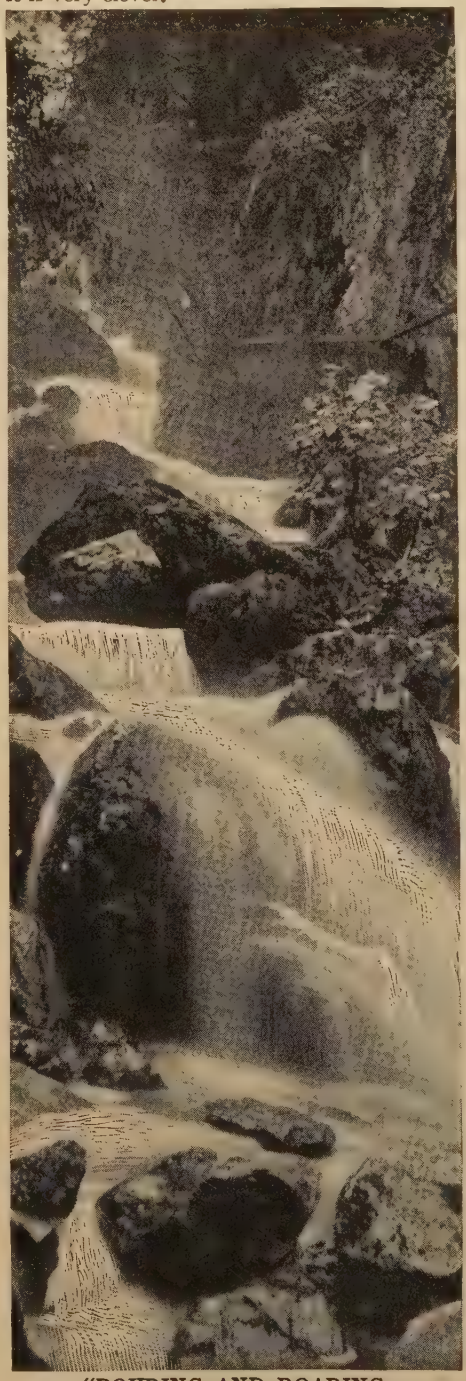
The pages of the BOOK OF POETRY abound in beautiful poems that derive their interest entirely from daily life and the common things around us. There is poetry in everything, if we have only the soul to search it out. There is poetry in the common horse, working out its laborious life in the city streets, as well as in the Arab's steed in splendid flight across the plain. There is poetry in the meadow, with its buttercups, its lambs, its gentle streams. There is poetry in the old armchair, the grandfather's clock, the kindly blue smoke arising from the hearth of the old village home. All common things are beautiful in the eye of the poet, who loves his fellowmen and the quiet ways of life; and all these things are celebrated in English poetry, which is remarkably rich in praise of the human affections.

After all, these are the enduring memories—the house we played in as little children, the friendly cat and dog, the fire in the old grate where we used to see such wonders, the old chair, the flowers at the window.

When we have concluded these little studies of poetry, the BOOK OF POETRY itself will be continued, as the young reader will have received sufficient assistance to enable him or her to take a serious interest in the poems which are reprinted in it, and to understand them.

THE CATARACT OF LODORE

The Falls of Lodore are in the English lake country, not far from the home of Robert Southey, who wrote this poem when he was Poet Laureate. "The Cataract of Lodore" is not of a high order as poetry, but as an exercize in rhyme, imitating the movement of the water, it is very clever.



"POURING AND ROARING,
AND HURRYING AND SCURRYING."

HOW does the water come down at Lodore?
My little boy asked me thus, once on a time,
Moreover, he task'd me to tell him in rhyme;
Anon at the word there first came one daughter,
And then came another to second and third
The request of their brother, and hear how the water
Comes down at Lodore, with its rush and its roar,
As many a time they had seen it before.
So I told them in rhyme, for of rhymes I had store.
And 'twas in my vocation that thus I should sing,
Because I was laureate to them and the King.

From its sources which well
In the tarn on the fell,
From its fountain in the mountain,
Its rills and its gills,
Through moss and through brake,
It runs and it creeps,
For awhile till it sleeps,
In its own little lake;
And thence at departing,
Awakening and starting,
It runs through the reeds,
And away it proceeds,
Through meadow and glade,
In sun and in shade,
And through the wood shelter,
Among crags in its flurry,
Helter-skelter—hurry-skurry.

How does the water come down at Lodore?
Here it comes sparkling,
And there it lies darkling;
Here smoking and frothing,
Its tumult and wrath in,
It hastens along, conflicting, and strong,
Now striking and raging,
As if a war waging,
Its caverns and rocks among.

Rising and leaping,
Sinking and creeping,
Swelling and flinging,
Showering and springing,
Eddying and whisking,
Spouting and frisking,
Twining and twisting,
Around and around,
Collecting, disjecting,
With endless rebound;
Smiting and fighting,
A sight to delight in;
Confounding, astounding,
Dizzying and deafening the ear with its sound.

Reeding and speeding,
And shocking and rocking,
And darting and parting,

And threading and spreading,
And whizzing and hissing,
And dripping and skipping,
And whitening and brightening,
And quivering and shivering,
And hitting and splitting,
And shining and twining,
And rattling and battling,
And shaking and quaking,
And pouring and roaring,
And waving and raving,
And tossing and crossing,
And flowing and growing,
And running and stunning,
And hurrying and skurrying,
And glittering and frittering,
And gathering and feathering,
And dinning and spinning,
And foaming and roaming,
And dropping and hopping,
And working and jerking,
And heaving and cleaving,
And thundering and floundering;

And falling and crawling and sprawling,
And driving and riving amd striving,
And sprinkling and twinkling and wrinkling,
And sounding and bounding and rounding,
And bubbling and troubling and doubling,
Dividing and gliding and sliding,
And grumbling and rumbling and tumbling,
And clattering and battering and shattering;

And gleaming and steaming and streaming and beaming,
And rushing and flushing and brushing and gushing,
And flapping and rapping and clapping and slapping,
And curling and whirling and purling and twirling,
Retreating and beating and meeting and sheeting,
Delaying and straying and playing and spraying,
Advancing and prancing and glancing and dancing,
Recoiling, turmoiling and toiling and boiling,
And thumping and flumping and bumping and jumping,
And dashing and flashing and splashing and clashing—
And so never ending, but always descending,
Sounds and motions for ever and ever are blending,
All at once and all o'er, with a mighty uproar—
And this way the water comes down at Lodore.

ON MAY MORNING

These lines were written by the great poet John Milton. They are in what we call the "classic" style of poetry, stately and academic, and therefore not so "natural" as the verse of poets such as Wordsworth, Burns, and Tennyson.

NOW the bright morning star, day's harbinger,
Comes dancing from the east, and leads with her
The flow'ry May, who from her green lap throws
The yellow cowslip, and the pale primrose.
Hail, bounteous May, that doth inspire
Mirth and youth and warm desire!
Woods and groves are of thy dressing,
Hill and dale doth boast thy blessing.
Thus we salute thee with our early song,
And welcome thee, and wish thee long.

"FOAMING AND ROAMING, AND THUNDERING AND FLOUNDERING."

MARCH

What we mean by "natural" poetry is very clearly illustrated in the following verses by Wordsworth, when we compare their direct and simple pictures of natural objects with the artificial grandeur of Milton's lines "On May Morning."

THE cock is crowing,
The stream is flowing,
The small birds twitter,
The lake doth glitter,
The green field sleeps in the sun;
The oldest and youngest
Are at work with the strongest;
The cattle are grazing,
Their heads never raising,
There are forty feeding like one!

Like an army defeated
The snow hath retreated,
And now doth fare ill
On the top of the bare hill;
The Plough-boy is whooping anon, anon.
There's joy in the mountains;
There's life in the fountains;
Small clouds are sailing,
Blue sky prevailing;
The rain is over and gone!

THE FISHERMAN

Barry Cornwall in these lines is taking, perhaps, too gloomy a view of the fisherman's lonely life; for, after all, to be "companion of the sea and silent air" is not to live entirely in vain.

A PERILOUS life, and sad as life may be,
Hath the lone fisher, on the lonely sea,
O'er the wild waters labouring far from home,
For some bleak pittance e'er compelled to roam:
Few hearts to cheer him through his dangerous life,
And none to aid him in the stormy strife:
Companion of the sea and silent air,
The lonely fisher thus must ever fare:
Without the comfort, hope—with scarce a friend,
He looks through life and only sees its end!

THE PARROT

This is a true story which Thomas Campbell, the famous Scottish poet, put into verse; and it proves what we have said so often, that in the events of ordinary life there is all the tragedy, the pathos, and the humor of the best poetry.

A PARROT, from the Spanish main,
Full young and early caged came o'er,
With bright wings, to the bleak domain
Of Mulla's shore.

To spicy groves where he had won
His plumage of resplendent hue,
His native fruits, and skies, and sun,
He bade adieu.

For these he changed the smoke of turf,
A heathery land and misty sky,
And turned on rocks and raging surf
His golden eye.

But petted in our climate cold,
He lived and chattered many a day:
Until with age, from green and gold
His wings grew grey.

At last when blind, and seeming dumb,
He scolded, laugh'd, and spoke no more,
A Spanish stranger chanced to come
To Mulla's shore;

He hail'd the bird in Spanish speech,
The bird in Spanish speech replied;
Flapp'd round the cage with joyous screech,
Dropt down, and died.

THE USEFUL PLOUGH

This is a charming old English song, whose writer is unknown, but who must have surely known and loved the rural life.

A COUNTRY life is sweet!
In moderate cold and heat,
To walk in the air, how pleasant and fair,
In every field of wheat,
The fairest of flowers adorning the bowers,
And every meadow's brow;
So that I say, no courtier may
Compare with them who clothe in grey,
And follow the useful plough.

They rise with the morning lark,
And labour till almost dark;
Then folding their sheep, they hasten to sleep;
While every pleasant park
Next morning is ringing with birds that are singing,
On each green, tender bough.
With what content and merriment,
Their days are spent, whose minds are bent
To follow the useful plough!

CASABIANCA

This is perhaps the best known of the many poems of Mrs. Hemans. It is the true story of the death of a boy aged about thirteen years. His father, who was admiral of the Orient, in the battle of the Nile, bade his young son remain at his post. The ship took fire, the admiral was killed, and all left except the noble boy, who would not leave his post without his father's permission. The flames reached the powder, the vessel exploded, and with it perished Casabianca.

THE boy stood on the burning deck
Whence all but he had fled;
The flame that lit the battle's wreck
Shone round him o'er the dead.

Yet beautiful and bright he stood,
As born to rule the storm;
A creature of heroic blood,
A proud, though childlike form.

The flames roll'd on—he would not go
Without his father's word;
That father, faint in death below,
His voice no longer heard.

He call'd aloud, "Say, father, say,
If yet my task is done!"
He knew not that the chieftain lay
Unconscious of his son.

"Speak, father," once again he cried,
"If I may yet be gone!"
And but the booming shots replied,
And fast the flames roll'd on.

Upon his brow he felt their breath,
And in his waving hair,
And look'd from that lone post of death
In still yet brave despair.

And shouted but once more aloud,
"My father, must I stay?"
While o'er him fast, through sail and shroud,
The wreathing fires made way.

They wrapt the ship in splendour wild,
They caught the flag on high,
And stream'd above the gallant child
Like banners in the sky.

There came a burst of thunder-sound—
The boy—oh, where was he?
Ask of the winds that far around
With fragments strew'd the sea!

With mast, and helm, and pennon fair,
That well had borne their part—
But the noblest thing that perish'd there
Was that young, faithful heart!

LITTLE VERSES FOR VERY LITTLE PEOPLE

I LOVE sixpence, pretty little sixpence,
I love sixpence, better than my life;
I spent a penny of it, I gave a penny of it,
And I took fourpence home to my wife.

Oh! my little fourpence, pretty little fourpence.
I love fourpence better than my life;
I spent a penny of it, I gave a penny of it,
And I took twopence home to my wife.

Oh! my little twopence, pretty little twopence,
I love twopence better than my life;
I spent a penny of it, I gave a penny of it,
And I took nothing home to my wife.

Oh! my little nothing, pretty little nothing.
What will nothing buy for my wife?
I have nothing, I spend nothing,
I love nothing better than my wife.

PEASE-PUDDING hot,
Pease-pudding cold,
Pease-pudding in the pot,
Nine days old.
Some like it hot,
Some like it cold,
Some like it in the pot,
Nine days old.

THE fair maid, who, the First of May,
Goes to the fields at break of day,
And washes in dew from the hawthorn tree,
Will ever after handsome be.

PRETTY maid,
Pretty maid,
Where have you been?
Gathering a posie
To give to the queen.

Pretty maid,
Pretty maid,
What gave she you?
She gave me a diamond
As big as my shoe.

LITTLE Miss Muffet,
She sat on a tuffet,
Eating of curds and whey;
There came a big spider
And sat down beside her,
And frightened Miss Muffet away.

HIGGLEPY, Piggleby,
My black hen,
She lays eggs
For gentlemen;
Sometimes nine,
And sometimes ten,
Higglepy, Piggleby,
My black hen.

FIDDLE-DE-DEE, fiddle-de-dee, the fly has married the humble-bee;
They went to church, and married was she; the fly has married the humble-bee.

LITTLE VERSES FOR VERY LITTLE PEOPLE

THERE was a man, and he went mad,
And he jumped into a biscuit bag;

The biscuit bag it was so full,
So he jumped into a roaring bull;

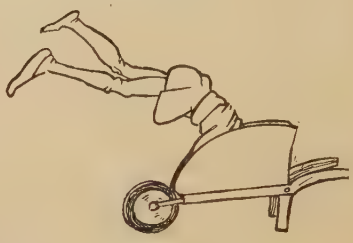
The roaring bull it was so fat,
So he jumped into a gentleman's hat.

The gentleman's hat it was so fine,
So he jumped into a bottle of wine;

The bottle of wine it was so dear,
So he jumped into a barrel of beer;

The barrel of beer it was so thick,
So he jumped into a walking-stick;

The walking-stick it was so narrow,
So he jumped into a wheelbarrow:



The wheelbarrow began to crack,
So he jumped into a haystack;

The haystack began to blaze,
So he did nothing but cough and sneeze!

JACK SPRAT could eat no fat,
His wife could eat no lean;
So it came to pass, between them both,
They licked the platter clean.

Jack ate all the lean,
Joan ate all the fat;
The bone they picked it clean,
Then gave it to the cat.

Jack Sprat was wheeling
His wife by the ditch;
The barrow turned over,
And in she did pitch.

Says Jack: "She'll be drowned,"
But Joan did reply:
"I don't think I shall,
For the ditch is quite dry."

Joan Sprat went to brewing
A barrel of ale,
She put in some hops
That it might not turn stale.

But as for the malt,
She forgot to put that;
"This is brave, sober liquor,"
Said little Jack Sprat.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF JULY

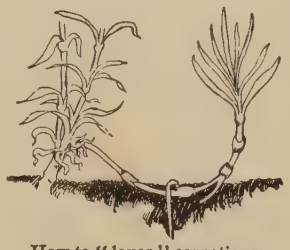
CONTINUED FROM 1250

PERHAPS we have a few plants of the sweet-smelling white pinks in our garden, and have decided that we should like to have a whole edging of them either at the top or bottom of our little plot. If so it is an easy matter to increase the supply, even from a plant or two, to make a sufficient number. If we take off a shoot in order to plant it, that it may strike root, we call it a cutting, but in the case of pinks we call it a piping.

From one plant we may secure a good many pipings. The lower leaves should be removed, and either in some spare spot or in pots and boxes we may plant them, putting some silver sand with the soil, and making them quite firm.

This is the usual way of increasing pinks, but another method is oftener used in dealing with their near relations, the carnations. We do not remove the pipings, but we take these growths and "layer" them round the plant, and then, when they are rooted, sever them from the parent plant.

Now, if we have a few carnation plants we are sure to want to "layer" them; for one thing, because it is a most interesting bit of garden work, and, secondly, because it is advisable not to keep carnations many seasons, as the stems grow "leggy" and old-looking and produce fewer and smaller flowers than younger plants. The process is by no means difficult, and any one can perform it if one knows clearly what is needed.



How to "layer" carnations

With a sharp knife we kneel down beside the plant, and, taking a young shoot, we note a joint in the stem, and remove the leaves below this, then taking the knife we make an incision partly through the stem slantwise. The tongue portion is let into the soil, and a stick, cut to make a little peg, holds the layer in place, and about two inches of soil are carefully put over it. If the work is done at the present time the layers should be successfully rooted in about six weeks, and can be removed then or at any time during the early autumn. Carnations, as a rule, flourish and flower splendidly near the sea.

Later on we shall learn how to grow roses on their own roots, but we need not wait for the autumn if we wish to try an interesting experiment—that is to say, to strike a few cuttings in bottles of water. The climbing Crimson Rambler or the pretty little Dorothy Perkins may be used, as they root very easily. A growth that has borne a bunch of flowers may be selected, as that will probably be in the right stage to grow well—very young, soft growths should never be chosen.

We take a growth, then, that has borne flowers, and cut it under a joint, taking about eight inches as the whole length, and simply put it into a bottle of water. It may remain for some while yet, and then may be planted in a pot, or outside in the little plot. Great care must be taken in the planting, because roots that have grown in water are far more brittle than if grown in soil.

Very often where there are village and other local shows there are special classes for children. If a pot plant is shown the pot must be very clean, and soil should be quite sweet at the top—that is to say, it should not look caked or mossy. If the plant is one to need it, it should have a neat stake and be carefully tied to it, and the ends of the tying material cut off neatly. The plant should be watered the day before showing.

In the case of cut flowers it is generally advisable to cut the day before and keep in water in a cool, dark place; in sending flowers by post they travel better if cut some hours previous and placed in water, and the stalks dried on a soft cloth before packing.

In selecting vegetables for exhibition, we should aim at an even size; we should select the largest, of which we have enough to give us the number required.

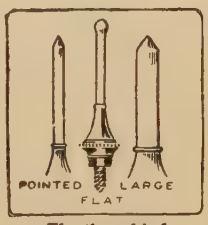
MAKING A BEAUTIFUL BELT

WE are going to make an artistic belt out of a plain, cheap leather belt, which we shall decorate into something quite charming by the aid of poker-work. Pokering is a method of making patterns on wood by burning, so causing the surface to change from white to a deep brown in color.

1. The poker-work machine

As it would be very inconvenient, and perhaps somewhat dangerous, to use a real poker, and have to be continually heating it in the fire, a little machine has been invented which does the work very simply and easily.

It consists of a delicate little point made of platinum fixed into a metal tube, with a cork covering for the handle. Cork, we know, is a non-conductor of heat, so that it prevents the hand from getting hurt. This point, with a handle, is attached to a bottle of benzoline by an india-rubber tube. Also connected to the bottle by another tube is a bulb, which takes the place of bellows. After the platinum point has once been heated in the flame of a candle, it can be kept red-hot as long as one wants it by pressing the bulb—i. e., blowing the bellows. This is because benzoline is a very inflammable fluid, and gives off a sort of vapor, which rises through a hole in the bottle-cork, gets up into the indiarubber tubes, and so passes along to the point where it is burnt. As it burns, it keeps the point red-hot.



2. The three kinds of points

There are three kinds of points—large, flat, and pointed—as we can see in picture 2. The large one is for deep work and rough wood, the flat one for shading and filling in, and the fine one for outlining a delicate pattern and for fine work generally.

Wood is not the only material which can be used for pokering. Leather lends itself well to this form of decoration, and, if carefully done, can be made quite charming. There is absolutely no danger in using this machine, though, of course, it is not meant for little fingers, but only for bigger boys and girls.

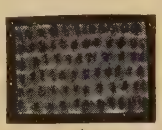
Before we can begin to make our belt, we must practise a little on something that does not matter if we spoil it. Get a piece of plain white wood, with a smooth surface, from a carpenter, who will sell it for a few cents. It will help you to learn how to manage the machine, and you will not be spoiling anything expensive.

You will find out by experiment how hard to blow, because, of course, the harder you blow the hotter becomes the point. We shall find that we need a smaller amount of heat for leather than for wood. If we are using too much heat, a small flame will flicker at the end of our point as it touches the wood. This must be avoided, because it makes the surface black instead of brown, by burning it too deeply.

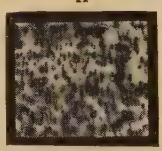
The chief effects are got by contrast of color—that is, light and dark browns—and difference in the depth of the thickness of the lines.

The tones of brown which one can get vary from a pale yellowish tint to a brown which is almost black. And the lines can be merely faint marks, just indicating the vein of a leaf, or quite deep cuttings in the wood.

Then there are different ways of filling in backgrounds. In picture 3 there are two, and we shall be able to invent others for ourselves. In the first one (marked A) the flat point is used, as it is pressed along the surface of the wood in rows more or less straight, and it leaves its impression behind. The pattern thus formed is very pleasing, and suggests fine leather. The other one (marked B) is more like the grain of wood, and is done by passing the fine point rapidly over the surface, backwards and forwards, keeping it steadily at the same heat all the time, and holding it so that it lies as flat as possible—that is, on its side—upon the wood.



A



B

3. Two ways of filling in

We must learn to do each of these different things, and then think *in what place* to use them. For instance, let us suppose we are decorating a picture-frame. If we think, we shall see that it hangs on the wall a good way away from us. Therefore, the decoration should be bolder in design and more deeply burnt than a little box which is constantly in our hands. The most important point to remember is to think which is the most suitable way to work.

4. The belt

Before you start, always say to yourself, "Where is it going to rest when it is finished—high or low? and what is to be its use?" Someone once did a wooden tea-tray, and burnt a big pattern out all over the bottom, so deeply that there were ridges and furrows which prevented small cups and saucers from standing straight and firm, and so the tray became almost useless.

Let us be sure that our things are fit for their use, as well as beautiful. Sometimes a little color may be added

to a pattern, but this can only be done when we have had a good deal of practice. Ordinary wood-stain or water-color may be used, though, of course, the paint must never be put on to a pokered part.

With regard to patterns, those composed of flower-leaves and simple shapes are the best. Figures do not lend themselves well to this work, because they are so difficult to do well unless one is good at figure-drawing.

The belt in the picture is pokered in a design of small leaves, but its principal charm is that the leaves themselves are burnt right away, and fastened in behind is a strip of satin ribbon, which shows through the holes.

The kind of belt to use is a plain, light fawn leather, of the most ordinary kind, with a smooth surface and a plain buckle. It usually costs about a quarter. If you can draw only a little it will be quite enough to enable you to sketch in the leaf-shapes with lead pencil at intervals all along the strip, taking care that the design does not interfere with the buckle-holes when you come to that end. Whatever design you decide to use, do *not* omit the narrow border along each edge. When you have made the marks for the leaves fill in the little connecting leaves.

Use the fine, thin point to pierce the leather round the outline of the leaves, going over the line several times with a fair amount of heat, and the piece will drop out. Then carefully darken the edges with the point, and smooth away any little bits which destroy the leaf-shape of the hole.

The border at the edge is the darkest part. Make that fairly solid with one of the "filling in" patterns given in picture 3. The space between the border and the lines which connect the leaves is dotted with the sharp point. Hold the poker in an upright position for these, and press gently, taking care to make the dots of equal depth.

A small spot of sealing-wax at each end, and one in the middle, will keep the ribbon in place and prevent it from riding up when worn. Use a ribbon slightly narrower than the belt. The complete machine can be ordered from any of our big stores, and costs from one to three dollars.

HOW DID THE LADIES CUT THE CARPET?

THREE Japanese ladies possessed a square ancestral carpet of considerable value, treasured as an interesting heirloom in the family. They decided to cut it up and make three square rugs of it, so that each should possess a share in her own house.

One lady suggested that the simplest way would be for her to take a smaller share than the other two, because then the carpet need not be cut into more than four pieces.

There are three easy ways of doing this, which we will leave you the amusement of finding for yourself, merely saying that if you suppose the carpet to be nine feet square, then one lady may take a piece six feet square whole, another a six-feet square in two pieces, and the third a three-feet square whole. But this generous offer would not for a moment be entertained by the other two sisters, who insisted that the square carpet should be so cut that each should get a square mat of exactly the same size.

How did the Japanese ladies cut this carpet?

Now, according to some wise people, the Japanese ladies would have found it necessary to cut the carpet into seven pieces in order to get the mats the same size, but Mr. Dudeney tells us, in "The Canterbury Puzzles," that a correspondent in Tokio has assured him that they did it in six pieces only. Can you cut out the six pieces that will form three square mats of equal size? The way in which the Japanese ladies did this is explained in that part of our book beginning on page 1359.

HOW TO HIDE IN THE OPEN COUNTRY

IN these days of scouting and camp holidays it is useful to know how to keep ourselves from being seen when out in the open country; so that if we are doing any serious scouting, or are playing any of the well-known scout games, we may hide from those we are watching or following.

The first point to remember is that we should always keep low down—lying on the ground when still, and crawling when we move. To appear above the skyline on rising ground is fatal to concealment.

A little thought and examination of our surroundings will enable us to select the best background for concealing ourselves. If we have to move across a tract of country that is probably being watched, it is wise to make ourselves look as much like the surroundings as possible. We remember that when the Scottish Prince Malcolm marched with an army against Macbeth, who was shut up in the Castle of Dunsinane, the attacking army came from Birnam Wood, and in order that their advance might not be noticed, each soldier carried a bough from a tree. Savage hunters often dress in the skin of some wild beast in order that they may pass unnoticed.

BÉBÉ EST MALADE

A LITTLE FRENCH PLAY FOR THE SCHOOLROOM

THE play tells how an anxious mother sends for the doctor to see baby, who has been crying a good deal and seems unwell. The nurse fears that she has the measles, and mamma asks if she is going to die. But the doctor tells Ninette to hold her tongue, and says baby has had too much to eat. That is all! She must go to bed quickly, and take some medicine.

MAMAN wears a long dress, with a train.

NINETTE, the nurse, has a mob cap and a smartly frilled apron.

BÉBÉ wears a white frock, with a wide pink sash.

LE MÉDECIN wears a silk hat and long overcoat. He has eyeglasses hanging from his neck, a watch in his pocket, and a medicine-bottle sticking out of his overcoat.

The scene can be played at one end of a sitting-room, with a couch and a small table.

MAMAN (seated on a couch, holds up to view a child's bonnet which she is embroidering): Ah, que BÉBÉ sera mignon avec ce joli petit bonnet! (Gets up and throws bonnet on to the table.) Où est-elle donc? Pourquoi Ninette ne l'amène-t-elle pas? (A knock at the door.) Entrez!

(Enter Ninette leading Bébé.)

NINETTE: Pardon, madame. Je suis en retard, mais Bébé a tant pleuré. Regardez, madame! Elle est toute rouge! Elle doit être bien malade!

MAMAN: Malade! O ciel, Ninette, ne dites pas cela! Malade! Ma pauvre chérie, viens ici! (Flings her arms round Bébé.)

NINETTE: Que faut-il faire, madame?

MAMAN: Allez chercher le Médecin! Courez vite!

NINETTE: Oui, madame. (She runs off, and Maman sits down with Bébé on her knee.)

MAMAN: Ah, mon amour, mon ange, viens faire dodo!

(A knock at the door.)

MAMAN: Entrez!

(Ninette enters with a curtsey, ushering in le Médecin.)

NINETTE: Monsieur le Docteur!

MAMAN (puts Bébé on the couch): Bonjour, Monsieur le Docteur!

LE MÉDECIN: Bonjour, madame! (He bows low, with a flourish of his hat, which he then gives to Ninette, together with his gloves and bag. Ninette places them on the table.) Qu'avons-nous ici? (Pompously. Ninette takes up her position behind the couch.)

MAMAN: Bébé est bien malade, monsieur!

NINETTE (pertly bobbing her head forward): C'est la rougeole, n'est-ce pas, monsieur?

LE MÉDECIN (cro-s'y): Taisez-vous! (Puts on his eyeglasses.) Tire la langue! (To Bébé.)

BÉBÉ (puts out her tongue).

NINETTE (pertly): Monsieur!. . .

LE MÉDECIN (crossly): Taisez-vous! (Takes out his watch.) Donne la main! (To Bébé. He feels the pulse, and replaces the watch.)

MAMAN (clasping her hands): Est-ce que Bébé va mourir, monsieur?

NINETTE (putting the corner of her apron to her eyes, and beginning to cry): Mourir! O ciel, madame, ne dites pas cela!

LE MÉDECIN (crossly): Taisez-vous donc! (Turning to Maman.) Non, madame. Votre enfant ne va pas mourir en ce moment. Elle a trop mangé, voilà tout!

MAMAN: Oh, merci, monsieur!

NINETTE: Merci, monsieur!

LE MÉDECIN: Maintenant, donnez-lui la remède que j'ai ici (taking a medicine-bottle from his pocket), et couchez-la vite!

MAMAN (taking the medicine): Oui, monsieur!

NINETTE (gives him his hat, and then holds the door open).

LE MÉDECIN (with a sweeping bow and a flourish of his hat to madame): Bonjour, madame.

MAMAN (with a deep curtsey): Bonjour, Monsieur le Docteur!

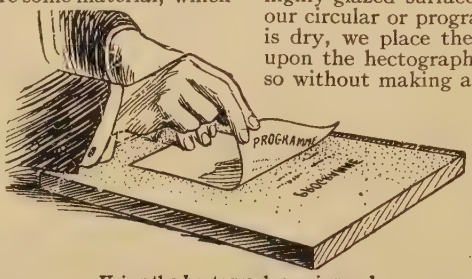
NINETTE (with a pert little bob, as the doctor goes out): Bonjour, Monsieur le Docteur.

DIFFERENT EXERCISES WITH DUMB-BELLS

A SIMPLE COPYING APPARATUS

THERE are many occasions when even a schoolboy would find advantage in having an apparatus that would enable him, after writing something out once, to take many copies of it without the labor of rewriting it. Therefore, in this article we shall see how to make what is called a *hectograph* — that is, a simply-made pad which gives the ability described above.

The first thing we require is a very shallow tin dish, which must be larger than any piece of paper we are likely to use for any circulars or programmes we are likely to make. The lid of a square or oblong bread box will do nicely. Then we require some material, which will not cost more than a few cents. We must have 1 ounce of gelatine, 1 ounce of dark brown sugar, 6 ounces of glycerine, and 2½ ounces of barium sulphate, which we can purchase from a druggist. We had better also have a 1-ounce bottle, which we can buy at a drug store. We break up the gelatine into small pieces, and put it in a small saucepan with 3 ounces of water, letting it steep there overnight. The bottle, filled three times, will give us 3 ounces of water. Next morning we pour in the glycerine, and heat the whole lot over a gentle fire. Now we put in the sugar and keep the mixture hot until the sugar also is dissolved. We take the barium sulphate and mix it up thoroughly with 1 ounce of water in a cup, and then pour this into the saucepan beside the other things we have already put there.



Using the hectograph copying pad

When we have mixed this thoroughly by stirring it, we pour it into the flat tin dish with which we provided ourselves. The dish should be quite clean and free from grease. If necessary, we can wash it with hot water and soap before we begin. When the mixture has hardened it will have a flat surface like soft indiarubber. It is then ready for use.

We can purchase hectograph ink at any stationer's, or we can make it ourselves. If we prefer to do the latter, we take our 1-oz. bottle to the druggist, and ask him for 2 drachms of methyl-violet aniline and 2 drachms of spirit. Fill up the bottle with water, and shake it until the aniline is dissolved.

The method of using our hectograph is simple. We take a piece of paper with a highly-glazed surface, and write with our ink our circular or programme. When the writing is dry, we place the paper, face downwards, upon the hectograph, taking care that we do so without making any wrinkles in the paper. Now we rub the back of the paper with the fingers so as to press the writing upon the surface of the composition. After the paper has remained five or ten minutes, we remove it, pulling it off by one end. The hectograph will be found to have taken the impression of the writing. We now take some sheets of paper not so highly glazed as the paper upon which we wrote, and press them, one after another, upon the hectograph surface, letting them lie for a few seconds before removing them. It will be found that an impression of the writing has come upon the paper, and that we can take forty or fifty copies of the circular before the ink becomes too faint to be legible.

To clean the hectograph we wash it first with a little water mixed with an eighth part of hydrochloric acid, also known as spirit of salt, and then with pure water. It should stand for at least twelve hours after it has been cleaned before it ought to be used again.

HOW TO MAKE INVISIBLE INK

DURING the first Afghan War, an officer in India received a paper on which was written only the word "Iodine." He put some tincture of iodine over the surface of the paper, and immediately an important message appeared upon it. The words of the concealed message had been written in rice-water, which made no visible marks; but when the paper came into contact with iodine the lettering stood out plain.

A method of secret writing which has been used by the friends of prisoners who write to them is ingenious and simple. A prisoner's friend may address to his unfortunate comrade a letter of a simple, ordinary nature, which is sure to pass the eye of the warden. The prisoner receives the letter in due course, and rubs a dirty finger between the lines of the visible writing, and new lines appear. The secret is simple. His friend has written between the lines a second letter in milk, and the passing of the dirty finger over the milk lines makes them visible. Sometimes one may want to write a letter that would be visible to the recipient, but would become invisible in a short time. An ink for this purpose may be made by taking 10 grains of arrowroot and boiling it in 1 gill of water, and then, when cold, adding 25 drops of tincture of iodine. The writing made with this ink is visible when written, but it becomes fainter and disappears in about four days.

Some inks, invisible when used, become visible by heating. If 1 drachm of chloride of cobalt and 1 drachm of gum arabic be dissolved in 1 ounce of water, the result is an ink which is invisible, but which becomes blue as the paper is heated, and again disappears when the paper becomes cold. It may be made to appear and disappear again as often as the paper is heated and allowed to cool. A green ink with the same properties is made by dissolving 10 grains of chloride of nickel and 10 grains of chloride of cobalt in 1 ounce of water.

GAMES TO PLAY AT A PARTY

THE MAN IN THE MOON

THIS game is a version of the popular Donkey Contest. Instead of pinning the tail on the Donkey, we go blindfolded to a white disk, and draw the Man in the Moon. Any number of players may join in this game. Pin as many 12 inch disks of white paper as there are players to a large piece of dark paper hung on the wall. Blindfold each one in turn and lead him to a disk, instructing him to draw with a piece of soft black crayon, the features of the "Old Man in the Moon." A prize may be given for the best drawing.

HORSE-RACING

TAKE five pieces of narrow tape about ¾ inch wide, and tie to a stationary object. Select five players to stand at the end of the tape, each with a pair of sharp scissors. At the signal each "horse" starts to cut through the centre of the tape, taking care not to cut horizontally across, the one finishing first being the winner. If he cuts the tape off, he is counted out. Knots may be tied in the tape to increase the fun and the difficulty.

A POTATO ANIMAL CONTEST

TWO materials we need to have on hand for the party are: a large number of potatoes of various sizes and shapes, some wooden skewers, toothpicks, shoe buttons for eyes, and some yarn for the manes and tails. Allow a certain amount of time for the players to make the animals (horses, elephants, cats, monkeys, etc.), and award a prize for the most realistic animal.

THE THREE-LEGGED RACE

THE boys stand together with the inside legs tied together firmly at the knee and the ankle. Another couple tied in the same manner also stand in line. At the signal "Go" they start to race to a given mark across the room, and the couple who reach there first is the winner. This game causes much merriment among the spectators, and the boys have much fun in spite of tumbles. Often the speediest couple will have a fall while the slower pair will succeed in winning the race.

CLOTHES PIN RACE

THE players under two leaders are divided equally into two rows facing each other. Each leader holds a handful of clothes pins, and at the signal passes them to his neighbor, one at a time, the object being to pass all the pins down and back again. If a pin is dropped it must be picked up by the one who let it fall, and then passed along. The side wins which gets all the pins back first.

ADVERTISEMENT CONTEST

CUT from magazines or papers, the pictures from a number of advertisements that are fairly well known, and mount each separately on a numbered card. Hang these around the walls of the room on the "eye line," and give each guest a piece of paper and a pencil. The person wins who guesses the largest number of advertisements. It is surprising how difficult this game really is, for we may be familiar with the pictures but forget the names of the advertisers. This game may be varied by using pictures of famous persons, authors, actors and artists, each mounted on a numbered card.

JACOB AND RACHEL

THERE are games and games, of course, but there is no game that causes more laughter and fun than Jacob and Rachel. It can be played in the gymnasium, in the playground or outdoors, and from eight to thirty players may join in the merriment.

One player, a boy, "Jacob," who is blindfolded, and another, a girl, "Rachel," stand in the centre of a circle of players. The object of the game is for Jacob to catch the other player, "Rachel," by the sound of her voice, while "Rachel" must try to avoid being caught even though she answers his questions.

"Jacob" starts the game by asking, "Rachel, where art thou?" Rachel replies "Here am I, Jacob," and quickly runs to another point within the ring, to avoid his outstretched arms as he gropes blindly about for her. Rachel may stoop to evade him, or may dash from one end of the ring to the other, but may not leave the circle. Jacob may repeat his question any number of times, and Rachel must reply each time.

When Rachel is caught, Jacob must guess her name. If he does guess correctly, then he may return to the ring and Rachel is blindfolded. The players in the circle select a new Jacob, and Rachel now starts the game by calling out "Jacob, where art thou?" to which he must reply, and Rachel then tries to catch him and guess his real name.

The game is made more amusing, when a large number of children are playing, for then two Rachels and two Jacobs may be playing in the ring. The two Jacobs are first blindfolded and two girls may be chosen, one assigned to each boy. Jacob must catch the girl chosen as his Rachel and guess her name, and if he makes a mistake by catching the wrong Rachel he must let her go and hunt for his own Rachel.

This game is usually played by both boys and girls, but where all boys or all girls are playing, the same names are still used, but one of the party is personated by a player of the opposite sex.

A LITTLE BOX THAT MAKES A WHIRLWIND

WE all know what a whirlwind is. Owing to differences in temperature, the air is set in motion in a spiral fashion, and sometimes the great whirling column of air rises to a thousand feet in height, and does an immense amount of destruction to property in the neighbourhood where it is.

It is to be hoped that none of us may ever be at any place where a really bad whirlwind is formed; but we may each of us make a miniature whirlwind in a very simple way. We take a box with a lid that swings backwards and forwards quite easily upon its hinges—a box such as the ordinary kind of cigar-box that holds a hundred cigars—and knock out the bottom of it. Then we stand it up on its end, and swing the door violently. The door pushes the air in front of it, and when it is closed there is for a moment no air left in its track. But instantly air rushes in from all directions to fill up the vacant place, and the result is a miniature whirlwind. That the air is whirling round may be seen by putting down in front of the box some tiny fragments of tissue-paper, which are carried round and round by the cyclone. Of course, the larger the box the greater will be the whirlwind. A soap-box, that may be obtained from almost any grocer, is a very good size to use for this experiment.

THE ANSWERS TO THE PROBLEMS ON PAGE 1104

56. Yes, Joan had enough money. If they had $45 between them, and Joan had $10.50 more than Janet, Joan must have had $5.25 more than half of $45, and Janet $5.25 less than half. Thus Joan had $27.75, and Janet had $17.25.

57. The engine goes forward along the main line, backs up the left side of the branch line and pushes car B through the bridge. Then the engine comes down the branch line to the main line, along the main line to the right of the picture, then up the right side of the branch line, and pushes car D up to car B. At this stage the position is like this:

Then the engine pulls down both cars, brings them both to the middle portion of main line, where it leaves car B (which is the one furthest in front of it), and, going back again with car D, pushes it up the right side of the branch through the bridge. The position is then like this:

Now the locomotive comes back again to the main line, takes car B, and leaves it at the post C, finally coming down again along the main line, up the left side of the branch line and pulls car D into its place. It can then return to the main line alone.

58. There were four in the party. The father and mother were brother and sister, one having a son and the other a daughter. The children were cousins, therefore nephew and niece, and the father and mother were thus uncle and aunt.

59. Evans does one day's work more than half the field, and Watson would take two days to do this piece, so that Evans does as much in one day as Watson does in two days. Thus, if they work together, Evans will mow two-thirds of the field, and Watson one-third. Thus Evans mows one-sixth more than half the field, and does this in one day; so that Watson mows one-twelfth of the field in one day. Together they will do one-sixth added to one-twelfth, which is one-quarter, and will take four days for the whole field.

60. At present Hugo has $1.25 more and Harry has $1.25 less than half the whole money. If Hugo wins, he will have three-quarters of the whole money, so that $1.25 is half the difference between half and three-quarters of the whole money. This means that $2.50 is the whole difference, so that they must have $10 between them. Hugo will have three-quarters of this $10 (that is, $7.50) if he wins, so that he must have $6.25 now, and Harry has the remaining $3.75.

61. John and his father together earn 25 cents per day more than Henry and his father, so that John earns 25 cents more than Henry. As the two sons together earn $1.75, John must earn $1 and Henry 75 cents. Thus the father earns $1.50 per day.

62. Divide $47.50 by $2.50 and the result is 19. Nineteen times $2.50 were charged for 12 visits. We have to find two numbers which, when added, make 19 and when one is added to half of the other make 12. The easiest way is to try several numbers. The number that we divide must be an even number. 18 and 1 make 19; but 9 (half of 18) and 1 make only 10. 16 and 3 make 19, but 8 (half of 16) and 3 make 11. 14 and 5 make 19, and 7 (half of 14) and 5 make 12. So 14 times $2.50, or $35, were charged for seven night visits, and 5 times $2.50 (or $12.50) for five day visits—that is, $47.50 altogether.

63. If 225 men took 7 months to make 21 miles of railway, they would take 9 2-3 months to make the remaining 29 miles. If 225 men would take 9 2-3 months to do something, the same work could be done in 5 months by 435 men. He therefore engages an extra 210 men.

THE NEXT THINGS TO MAKE AND TO DO BEGIN ON PAGE 1359

WHAT THIS STORY TELLS US

WHEREVER the rock under the soil is limestone we shall find caves. Water easily dissolves this stone and washes it away. Much of Kentucky lies over limestone, and in that state we find the Mammoth Cave, the largest in the world. It is not one cave, but dozens on different levels connected by passageways. There are lakes and underground streams, some of which are connected with the Green River, which flows above ground not far away. In these caves both on the floors and in the water are curious insects and fish which have lost their eyes from living so many generations in darkness. In this story we shall learn of the wonders of this great cavern.

WONDERFUL MAMMOTH CAVE

CONTINUED FROM 1008

THE world is full of natural curiosities, more wonderful than anything of man's construction. Our own land is richer in natural wonders than any other country, or any other continent; and not least among her treasures is Mammoth Cave, the largest known cavern in the world. It is situated in Edmondson County, in the west-central part of Kentucky, in the limestone region, and has been hollowed out by water which has dissolved the limestone. During the War of 1812 it supplied our country with a considerable quantity of saltpetre used in making gunpowder, when the supply of that material was stopped from abroad. At present it is a point of pilgrimage for tourists from all over the world. The unchanging darkness, the colossal grandeur of its proportions, its vast silences unbroken by the raging of storm and thunder without, make the cave a thing apart from all our other experiences. At all times of the year, Winter and Summer, Spring and Autumn, the temperature of the air remains the same, 54°, its cool dampness never varying, although the sun outside may be baking the atmosphere to a fervid heat, or the snow lie knee deep upon the ground. So majestic and sombre is the blackness of the place that it often has an unpleasant effect upon the nerves of visitors.

It is hard to realize that not so much as even a ray of light has ever penetrated these gloomy caverns in all the ages since they were hollowed out. In its inky pools and cascades, there are fish and crayfish that have no eyes. Long ago through underground streams their ancestors wandered into this world of darkness and silence. Gradually, through lack of use, their sense of sight became dulled and finally disappeared altogether. There are two varieties of these fish. One has no organs of sight, while the other has rudimentary eyes that have lost all power of seeing. Their color has also faded out as the generations have passed. There are about thirty other kinds of animals—mostly of the lower orders—to be found in the Cave, including crickets that have faded into a pale and sickly hue. Bats are also found in great numbers. There is one chamber called the Great Bat Room, where these little creatures cling in thousands to the walls and ceilings. "They are cold to the touch and when seized between the thumb and finger they shrug up their shoulders, move their wings lazily and perhaps utter a feeble cry."

The cricket is a long-legged variety that looks something like a spider. "These are everywhere and when they die they remain where they happen to be on the wall, while a white fungus covers them with a thick shroud till they look like snowballs with

Copyright, 1910, 1918, by M. Perry Mills.

legs. Some varieties of mushrooms have also been found, and the attempt to cultivate them for market has been made.

"In one of the vaults there are also mineral 'snowballs,' as the ceiling is of gypsum crystals. Farther on, the gypsum takes the form of flowers, chiefly marguerites, sunflowers and regal chrysanthemums, though roses too may be found and the graceful forms of

IN THE ROCKY CAVERNS OF MAMMOTH CAVE

Here is a picture that will give you something of an idea of the vastness of the underground passages of Mammoth Cave. The great cones, hanging like icicles from the roof, some of them, as you will see, much larger than a man, are called stalactites. Those rising upward from the floor are called stalagmites.

celery tops. The 'Vale of Diamonds' and the 'Jewel Chamber' are bright and sparkling both on ceiling and walls."

Let us take a trip through some of the most wonderful parts of this underground world. You enter by a flight of steps which passes under a great archway into the darkness. A guide holding a flaring torch on high leads the way. You follow him through the Narrows into the Great Main Cave. For a few minutes you feel stunned by the vastness and strangeness of this new world into which you have come. By the flickering light of the torch you can make out the great walls of rock and the massive roof rolling into domes and arches overhead. Some one shouts and the sound comes thundering back from the vast rocky caverns stretched out before us. It is a full minute before the echo dies away. As soon as you can still the thumping of your heart you follow the guide into the Vestibule or Rotunda, a great hall, which covers an area of one and a half acres of ground. The Great Vestibule was one of the chief workrooms for the manufacture of saltpetre which played so important a part in the War of 1812. The floor is strewn with heaps of nitrous earth and ruins of workmen's vats. We look up at the rough crystal-hung ceiling, looming above, and wonder how high it can be. The singular purity of the atmosphere makes it hard to judge, but the guide says it reached a height of 125 feet in some places.

The cave is not one great room, but dozens, which are connected by narrower passageways. Without a guide

THE ENTRANCE AND ECHO RIVER

The entrance to the great cavern is not at all striking. From a little clump of small trees a broad incline leads down into the earth. At one side is a flight of steps but the remainder of the incline is covered with autumn leaves which have drifted in. The picture was taken from inside the cave.

Echo River is in some places two hundred feet wide and forty feet deep. Boats with flat bottoms are provided and visitors can float about three-quarters of a mile before the river disappears into a hole in the rock. There are several other streams in the great cavern, some of which have never been explored.

Pictures by courtesy of the Louisville and Nashville Railroad.

you might easily be lost as these passages wind and twist and cross one another in a most puzzling way. Then, too, there are caves above caves as there are several different levels. You might easily step off into a great hole at the bottom of which is water.

From the Rotunda we pass into Audubon Avenue, sometimes called Big Bat Room, where thousands of bats take up their quarters for the winter season and cling together like swarms of bees. Returning and passing through the Main Cave, we come to the Kentucky Cliffs—so called because of a fancied likeness to the cliffs on the Kentucky River. From here we gradually descend into a great natural temple called the Church. A Gothic roof looms over us, its hoary, crumbling arches formed from natural stone ages ago. A rock ledge rising twenty-five feet in the air serves as a pulpit. Here for the past fifty years or more the gospel has been occasionally preached.

Leaving the Church we climb over mounds of earth turned up for the old saltpetre works until we come to the Gothic Arcade, where we see more signs of the old mining activities. Passing on we enter Stalagmite Hall where mighty rock crystals like icicles hang from the lofty dome and stretch upward in peaked cones from the floor. The dripping water dissolves the limestone as it passes over the rocky roof. As the drops run down the water slowly evaporates and leaves some of the lime. A stone icicle is formed which grows and grows. The water which falls from the tip to the floor gives up some of its lime and another cone is built up which points toward the ceiling. These stone icicles, hanging from the ceiling, are called stalactites; while those rising from the floor bear the name of stalagmites. From Stalagmite Hall we retrace our steps, for there is much yet to be seen on every hand. We must visit various points of interest in the miles of black halls stretched out around us, in all directions.

We must not fail to see the famous Star Chamber, which is considered one of the most beautiful things in Mammoth Cave. Here the guide leaves us sitting upon a bench by the wayside, straining our eyes into the pitchy blackness that closes in about us. Presently as we become accustomed to the dark, we see above us a midnight sky, with myriad tiny stars twinkling in the blue black dome. Then the guide returns. As he does so the stars vanish from the sky and he explains that it is an illusion caused by partially covering up his lantern and letting the rays of light play upon the stone crystals overhead.

In one portion of Mammoth Cave we come upon a little deserted village of roofless stone cabins, where many years ago, a number of consumptives took up their home, hoping to be benefited by the stationary temperature. They entered the Cave in the month of September. In January they tottered out, white and bloodless from their long absence from the sun, and most of them died soon after. This proves, as stated in another part of this book, that the sun is a great life giver, and when removed from its rays, neither men, animals, nor plants can live in their most healthy state.

Several rivers, among them the Styx and the Echo, find their gloomy way through the darkness. We embark on a flat-bottomed boat and paddle slowly down the Echo River. The rock ceiling under which the water runs is so low that at times it almost touches the tops of our heads, two and one-half feet only above the current flowing darkly underneath. As the boat slips along suddenly the guide raises his voice and runs down the scale of notes. Slowly the tones grow and swell until they come booming back from the cavern rocks in a rich and perfect accord. A feeling of awe settles down upon us. The solemn silence that, broken by the halloo of a man, resounds with a deafening roar,—the flickering light of the torch flames upon the grand rock walls and the unearthly stream that flows silently under the stern of our boat cannot fail to impress even the dullest mind.

So wonderful is the echoing quality of the rocks in portions of Mammoth Cave that many writers have spoken of the subject. John Burroughs says: "Another surprise was when we paused at a certain point and the guide asked me to shout or call in a loud voice. I did so without any unusual effect following. Then he spoke in a very deep

bass, and instantly the rocks all about and beneath us became like the strings of an æolian harp. They seemed transformed as if by enchantment. Then I tried but did not strike the right key; the rocks were dumb. I tried again, but got no response; flat and dead the sounds came back, as if in mockery; then I struck a deeper bass, the chord was hit, and the solid walls seemed to become as thin and frail as a drum-head or as the frame of a violin. They fairly seemed to dance about us, and then to recede from us. Such wild, sweet music I had never before heard rocks discourse. Ah, the magic of the right key!"

We must now pay a visit to the "Maelstrom," a huge black pit stretching thirty feet around, whose weird yawning mouth makes us draw back with an exclamation of dismay. The guide tells us that a young man, in a daredevil mood, persuaded some friends to lower him by a rope into the pit. Although he escaped without any bodily harm, it is not reported that he ever desired to repeat the experiment. His adventures in the horrible hole were described with great gusto by all the Louisville papers at the time.

There are many other underground halls of weird beauty and interest that we might well see before we leave Mammoth Cave,—such as the Giant's Coffin, the Dead Sea, the Fairy Grotto, or Lake Lethe, a broad basin of water enclosed by walls ninety feet high,—but we will confine ourselves to a visit to Mammoth Dome, where we shall find a tier of colossal columns that have won for themselves the name of the Hall of Karnak, from their resemblance to that Egyptian temple. For a minute the grandeur and silence of the place almost takes our breath away. Six huge columns, eighty feet from the top to bottom, and twenty-five feet through, support the roof. The gray of the stone is all covered with a coating of "yellow stalagmite, rich as jasper, and covered by tracery as elaborate as Chinese carving. The capitals are projecting slabs of limestone, and the bases are garnished by mushroom-shaped stalagmites." "How wonderful," we exclaim, as we come slowly to the realization that these mighty pillars were reared by the unaided hand of Nature, "How wonderful!" And our eyes travel from the massive columns to the stalagmite blocks of red and black that pave the floor in a mosaic pattern. "In looking up, one thinks of great cathedrals, or even of the perpendicular sides of some Western cañon; and although the dome is only one hundred and fifty feet away, it seems far higher."

We leave the dark and gloomy labyrinths of Mammoth Cave through a passageway rightly termed the Corkscrew. When at last we step out of the darkness, it is as if we were stepping from an "ice cellar into a Turkish bath, and the pure air of the Kentucky forests seems as laden with rich odors as a greenhouse, and for the first time we realize what an abundance of odors exist in ordinary air. It does not seem probable, however, as is often asserted, that there is anything especially exhilarating in the Cave air itself, as there is in mountain breezes. It is simply the purity and the coolness of this atmosphere that enable one to take the seventeen-mile trip underground without special fatigue." As we draw in a breath of the out-of-door air and glance around once more upon the world of wind-shaken leaves fluttering in the sun, upon a universe fairly ahum with life,—the drumming of locusts, the song of a bird, the lowing of distant herds,—we awake with a kind of shock from the unearthly strangeness of the place we have just left. "No vicissitudes of earth," writes John Burroughs, "no changes of season, no sound of storm or thunder penetrate there; winter and summer, day and night, peace and war,—it is all one; a world beyond the reach of change, because beyond the reach of life."

We linger a while near the entrance of the Cave to accustom our eyes to the searching yellow sunlight, and as we do so we grow used to the warm wind that sweeps to us through the woods, which as we have said, seemed at first so hot and sticky after the pure, cool atmosphere of the underground world. Finally we cross our rocky platform, reluctantly turning our backs upon the fascination of the open mouth of the great cavern, and climb the forest footway into the world.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1388.

LOOKING DOWN FROM A STONE A MILE HIGH

In this picture of the Yosemite Valley we see a striking example of the wonders of Nature. The valley lying between these immense cliffs was probably cut out by glaciers, or rivers of ice. It is seven miles long, and from it rise huge cliffs, some of them nearly 5,000 feet high. The sides of most of these cliffs are not only very high, but as straight and as smooth as the sides of a tower. Sometimes they have landings jutting out at great heights, as seen in this picture, from which venturesome travelers look down into the depths about a mile below. The Yosemite Valley, in California, with its wonderful cliffs, has some of the finest scenery in the world, including famous waterfalls, like Yosemite Falls, which drop 1,500 feet.

ROCKS THAT LOOK LIKE MEN

THE KNIGHT TEMPLAR, ON LUNDY ISLAND

"PUNCH," AT LLANDUDNO, WALES

"DR. SYNTAX," AT LAND'S END, CORNWALL

THE BISHOP, AT THE LIZARD, CORNWALL

"OLD MAN," NEW HAMPSHIRE

We have all picked up pebbles which look like potatoes, and potatoes like human heads, but Nature has also carved out huge heads and animals on cliffs and in rocks which stand up alone on moorlands. Wind and rain and sea are always wearing away the softer parts of the earth, and leaving the harder parts, which often take comical shapes, and some examples of these are given on this and the next page.

ROCKS THAT LOOK LIKE ANIMALS

THE TOAD'S MOUTH, AT HATHERSAGE, DERBYSHIRE, ENGLAND

NAG'S HEAD, ON ST. AGNES, SCILLY ISLES

THE DANCING BEAR, AT BRIMHAM

THE MONKEY'S FACE AND PULPIT, AT BRIMHAM, YORKSHIRE, ENGLAND

The curious shapes of men and animals made by the weather out of rocks and cliffs, as explained on the previous page, sometimes resemble well-known people, and the people who live near these rocks call them by their names. Sometimes, too, a rock is like an animal in a curious attitude, such as a dancing bear, a picture of which is shown above, or a crouching lion, and this gives it its name.

From photographs by Frith, Valentine & Knowles.

Y0-CIP-496